The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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vators.

all mercantile and manufacturing establishments where a large amount of goods, etc., are to be moved from floor to floor with greatest economy of time and labor. The high price of real estate in cities requires that buildings should be many stories in hight in order to obtain the requisite floor space at the least expense, while the high price of labor necessitates the use of the most economical means to make the upper floors available.

In erecting elevators, such items as cost of construction, efficiency and safety are most to be considered. Steam being the common mo- the following translation of the important

cylinder is set on timber or masonry in the cellar. Water is received from the street main through a pipe attached to the head of the cylinder. Near the hatch is a three-way double piston balance valve, used to control the movements of the machine. The cylinder is bored true, and the piston is packed with leather, hemp, cotton or rubber. The piston rod connects with a cross-head carrying several sheaves-which revolve freely on a shaft passing through them-and is supported by two wheels, that run on iron ways attached to the cylinder head at one end, and supported by stands at the other end. The outer stands support a corresponding set of sheaves that revolve freely on their axle. A wire rope is attached to this outer stand and coiled over the sheaves more or less in number, then extended to the top of the hatch over a carrying sheave down to the plat-

Two or more of the sheaves attached to the cross-head are made detachable by the hooks being thrown off from the shaft passing through the cross-head. These sheaves are supported by an extra shaft, and when detached from the cross-head they rest against an abutment near the fixed sheave, and become simply idlers; at the same time they cause a corresponding number of the fixed sheaves to become idlers also, thus chang-ing the power of the machine by using a less number of sheaves

nected to the cross head. If the machine is of 1000 pounds, by changing the combination, as above described, a load of 2000 pounds can The quantity of water used is, of course, in proportion to the load to be raised.

In classes of business that at times have heavy loads-the ordinary requirements of the elevator are for smaller packages and for passengers-as is the case in hardware, groceries, tobacco, &c., the light power is used, saving a large percentage of the cost for water for the ordinary traffic of the house. To change the machine for a greater load only requires the porter to run the platform to the cellar, throw off the hooks and operate the machine as before.

A large number of these machines have been made and put in use in Cincinnati, Louisville, St. Louis, Indianapolis, Toledo, Cleveland, Columbus, Wheeling, Washington, Baltimore, Newark, N. J., and many other cities, and may be relied as fully answering all the require-

Dr. Kayser has succeeded, without a battery, in coating metals with an alloy resembling German silver, thus giving them a handsome finish and making the surface more durable and melts together one part of copper and five of tives constructed by him in his works in the of widespread dislike and aversion. pure tin-preferably the Australian. The alloy is granulated, as usual, but not too fine, and the locomotive shall be paid to the builders on

become beautifully plated. Some fresh oxide plated in this manner without previous preparation; those of iron must first be copperto the above bath, or to a common white bath, and boiling, a coating richer in nickel is obof platinum to a blue-black, according to the amount of nickel salt added.

Rolling Stock in Russia.

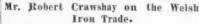
A Moscow correspondent sends to the Times draulic elevator, with changeable power. The shall contain provisions binding them (a) to and steel rail works; and (c), the alterations, blacksmiths and horse raisers would have been tion the old times when the workman used to

Lane & Bodley Co.'s Hydraulic Ele- laid in it. After bolling a short time they trial trip of not less than 3000 versts of the locomotive in question, with wagons attached, of nickel must, of course, be added from time the weight of which shall be regulated accord-Power elevators have become a necessity in to time. Brass and copper articles can easily be ing to the level of the railway line, and given in detail in the technical conditions of the private order, the execution of which shall have plated. By adding some carbonate of nickel been undertaken by the builder. The trial trip must be concluded not later than four months after delivery of each locomotive to the railway tained, and darker, varying in color from that company. 4. By way of experiment, for the to remove from Eastern eyes the scales of prejterm of two years until further examination in due legislative order, the importation of steel waste shall be allowed free of duty, only, how ever, when imported from foreign countries for cast steel and steel rail works, in quantities corresponding with their manufacture, in conformity with the decision of the Imperial is most extensively used in connection Russian decree, dated January 28, relating to Council, confirmed by His Imperial Majesty on with elevators, and buildings supplied with railway rolling stock: On the representation of the 6th of June, 1861, in reference to the imlines of running shafting require only a con- the Minister of Finance at the Committee of portation of foreign cast fron, wrought from nection by belts to the winding machinery to Ministers, in reference to the measures to be and iron waste for mechanical works, and in move the platform; but in buildings having and adopted for promoting and developing the accordance with the special instructions to be requiring no other motive power, a special construction of locomotives and, in general, of issued by the Minister of Finance on this substeam engine is too expensive to employ if a railway rolling stock in Russia, and on the ject. 5. The Minister of Finance shall be aucheaper power can be obtained. This is to be recommendation of this committee, his majesty thorized to present in due legislative order and an army of white laborers would have special propositions for—(a) the increase of the found employment on it for that much greater water supply, where the pressure and supply of January this year, the following: 1. That customs duty on foreign locomotives and tenare adequate, and where sewerage or drainage in getch shall be given for the future. 2. The relating to the importation of steel waste free statutes of newly projected railway companies of duty from foreign countries for cast steel

has been made to take his place as a being one plentifully dotted with little "one horse remove lower than his persecutor in the scale of humanity. Neither the numberless outrages inflicted on suffering Chinese in this city, nor the cruelties perpetrated against them in Antioch and many other places, nor the unjust to oppress and inconvenience him, have sufficed udice that have been so sedulously impressed and unreliable accusations. It was reserved truth that the active and unscrupulous persecutors of the Chinese are members of the substratum of society, violators of law and enemies of order and instice.

That we are in the way of being "ruined by Chinese cheap labor" can be readily made apparent with but little effort. But for that, the been constructed in less than two or three years after it had really commenced running, length of time. But for it our sons and grand-

sanguinary and devastating war, the Chinaman ashes for the same reason. Are not our streets shops, decorated with the proud assurance, "No Chinese Employed Here!" Do not our own daily journals demonstrate their sympapathy for the oppressed Caucasian from across a continent and on ocean, by cheering them to and discriminating laws and ordinances passed to oppress and inconvenience bim, have sufficed 'em Pomp," "Catch 'em Towser," "Worry to remove from Eastern eyes the scales of prejectory." It is really disagreeable, however, to know that after Pomp and Towser and upon their mental optics by false statements Tiger have done their bidding, their instigators and setters on have "gone back" on them, for the Chico horrors to reveal to outsiders the and pretend to be joyful that some of the pack have been consigned to the State Prison

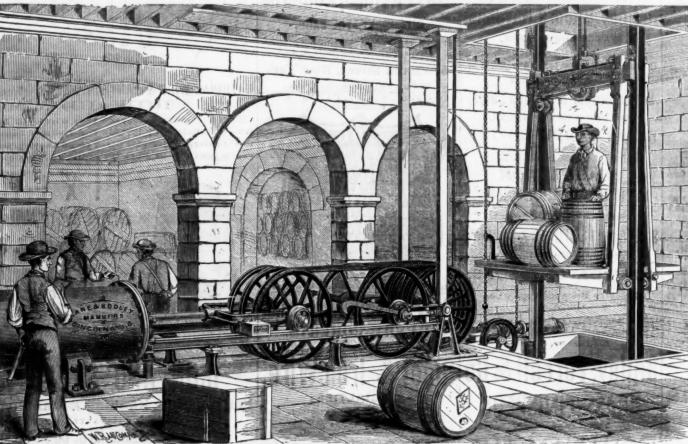


A few days ago a deputation of old workparent with but little effort. But for that, the great Central Pacific Railroad would not have Cyfarthfa Iron Works, to present an address expressive of their gratitude that he had been restored to health. His reply was as follows: "As many who are now here are unable to hear the few words I shall speak, I write them on paper, so that all may know how grateful I am ney with, and consequently, wheelwrights, this feeling, for it brings back to my recollect

> come himself to the employer to ask for what he wanted, and generally all passed off well and to the satisfaction of both parties. There are some now here who can remember me as a young man, and the great delight I had in working among you from morning until night. Nothing used to give me so much pleasure as to take the place of one of the men, and work the turn out. I think it was the happiest time of my life. When I got married I was obliged to give up working, but I still sometimes did so; and I still entertain the same kind and fond feeling for you all the same as ever I did, and to the best of my knowledge and ability always did all I could for you. That time has passed, and black times have come since then. You threw your old master overboard,' and took to strangers, and 'broke the tie' between yourselves and me. When the unionist deputation came up to me at the Castle, I asked them to give me a fortuight to work an old order of rails, and they refused, and I then told them the 'tie was broken' and from that day to this it bas. As far as the union itself is concerned I ought not to say a word against it, for it has saved me thousands; I should never, while I had any money left, have stopped the works if you all had not left me and joined the union. The times are now so bad that I believe every works which is going is losing money. I know I

wagon rolling stock, and also their first, sec- essary to be made in the customs duty on munity would have been undisturbed in the a single farthing by the works ever since they well on first establishing the line as during its | steel, and on certain articles belonging to rail- conveying their scanty crops to distant towns | judge what reliance you can place on what of Public by cart and wagon, while the draught animals has been told you, and by the letters you have as well as during its working. The locomothe in estimating the cost of new railway playful coyote, the agile ground squirrel, and very little hope, if any, of ever seeing tives and wagons which have to be thus oblibilines which are to be constructed, or of supple-the natural denizens of the barren waste could Cyfarthfa what it has been; the only chance of its ever being so is for it to be bought by a company, who will lay out a large amount of noney, and then it would pay. The coal trade is also nearly as bad as the iron trade; every ton of coal I lose money on by selling-au actual loss of so much per ton, and I am obliged to find money every month from other sources to pay you your wages. My losses have been very great, and I am now bound to do all I can to lessen them, which as the reason of my discharging men now and reducing the days of work. I am not afraid of any of the Cyfarthfa old workmen doubting what I tell them, for they know I have never told them. an untruth in my life. Thanking you all mossincerely from my heart for your warm and cordial greeting, and also for your kind wishes as to my sight and health, and with hopes I may be spared a few years yet, although pas my sixtleth birthday, to live among you.'

Experiments have recently been successfully made in Italy on a method of burning petroleum under steam bollers, which consists simply in pouring the oil over a thin layer of asbestus. The petroleum burns with intense heat, while the asbestus, being incombustible, is not affected, but serves as a means of retaining the oil and acting as a wick. During the experiments sheets of paper placed beneath the furnace were not injured, although the heat. from the oil above was most intense,



HYDRAULIC ELEVATOR BY THE LANE & BODLEY CO., CINCINNATI, OHIO.

working; and (b) to purchase in Russia all their tives and wagons which have to be thus oblito the railway companies partly from orders which have already been made up to that time the railway companies from the Russian railway rolling stock works. 8. Premiums at the undermentioned rates will be paid by the State Treasury for locomotives which have been constructed in Russian railway rolling stock works for private railway companies, the orders for which shall have been given after the promulgation of the present decree: (a) The premium tender, is fixed at 2400 roubles for each fourwheeled locomotive, 2600 roubles for each six fixed for the term of five years, commencing course of one year. (d) The premiums for

than is done by the detachable sheaves con- purchase in Russia the whole of their goods which on strict examination will be found nec- greatly profited. But for it the farming com- have lost money for years, and have not made way stock; and, 6. The Minister locomotives, also on first establishing the line Roads shall be authorized to adopt measures, lines which are to be constructed, or of supplealready existing, the estimates of the cost of the locomotive shall be based on the average countries, together with the amount of the customs duty.

Chinese Cheap Labor.

We find the following very sensible article in

the Commercial Herald of San Francisco: At no time has it been necessary to inform granted for each locomotive, together with its the intelligent and inquiring dwellers on the Pacific coast that the rabid and savage opposition and persecution of the Chinese has been wheeled, and 3000 roubles for each eight mainly confined to a shiftless and revolutionary ments of first-class power elevators. These elevators are manufactured by the Lane & granted for such locomotives only as shall have with peace and order. The exceptions to this granted for such locomotives only as shall have been more apparent than real, and, been constructed exclusively of parts made in rule have been more apparent than real, and, Russian railway rolling stock works. (c) The although the facts were well established and premiums at the above mentioned rates are generally known, comparatively few have had the courage to give them public utterance. It

cially a human pariah, a mere chattel to be unequivocal expression to their burning, rightthen mixed with water and cream of tartar—as their presenting a certificate from the gov- bought and sold, the element of which we cous indignation. Yea, even California sepafree from lime as possible—into a paste. To ernment inspectors of the railway company speak made him the unresisting target for their tors and congressmen have discarded their toeach 200 parts of the granulated alloy is added to which the locometive shall have been demailgnant shafts; but the situation being com- gas in the walls of our national Legislature one part of oxide of nickel, and the articles are livered, certifying the satisfactory result of the pletely changed by the dreadful process of a and covered their nakedness with sackcloth and

with eight sheaves, and will raise a load ond, and third-class passenger carriages, as steel in every shape, on objects made of east exquisite repose of uninterrupted solitude, eat up the profits on the road. But for it the seen sometimes in the newspapers. I have gatorily purchased in Russia, shall be delivered mentary works and supplies for railway lines have howled and frisked, and enjoyed existence undisturbed by cruel man. But for it the Southern Pacific Railroad and the railway netby government and partly by direct order of prices actually charged for them in foreign work of the whole coast would have been reserved for the energy, enterprise and usufruct of generations to come. But for it the reclaimed swamp and overflowed lands and landlocked islands of California would still be in a state of nature, the former haunts of ducks, geese and other water fowls. But for it the irrigating canals and ditches of California would have had no existence. But for it we would now enjoy the inexpressible satisfaction of showing our generosity by paying four or five times what it is worth for every article of daily consumption. But for it marriages of people with limited means would have been far less numerous, and divorces proportionately fewer, while the masses reveled in unwashed linen and seedy outer garments.

It is quite superfluous to elte other reasons going to show the rain caused by Chinese cheap from the date of the promulgation of the pres- is furthermore beyond question that the bulk labor. It has been so monstrous, so beyond all ent regulations, and shall be paid to every loco- of opposition has come from a source that but bearing that the governor of the State, the permanent than that of tin or sliver. He first motive builder for not more than 80 locomo- a quarter of a century ago was itself the object mayor of San Francisco, a majority of our civic authorities, and not a few of our daily So long as the negro was politically and so- journals have been prominent in giving public

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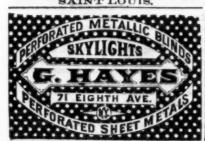
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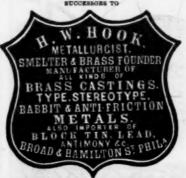
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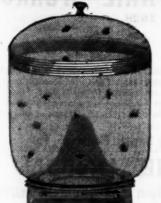
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Galvanizing Iron.

Several correspondents have lately asked us for a description of the process of galvanizing iron. The following will probably give them all the information they need:

rolling mill, are brought to the galvanizing works in bundles and immersed in a vat of dilute sulphuric acid. The vat, which is lined with lead, is filled with water to about 4 inches below the top of the sheets, which are placed in the vat on their edges. Sulphuric acid is then poured in until the liquid just covers the metal. Ten bundles of sheet iron, each weighing 150 pounds, are placed in the vat at a time, and half a carboy of acid used. The bundles remain "in pickle" for an bour and a baif, after which they are removed, 10 more bundles placed in the vat, and half a carboy of acid added. When these last bundles have been pickled and removed, the whole contents of the vat must be allowed to run off. This refuse is used to galvanize miscellaneous matters, such as ships' bolts, nails, spikes, anchors, chains, &c. The vat is filled again with fresh water and acid, and 20 bundles more prepared in a sımilar manner.

Upon being taken from the sulphuric acid vat, the sheets are immediately immersed in an alkaline solution, potash being preferable, and the acid adhering to them neutralized. The sheets are next immersed in vats of pure water. from which they are afterward taken, placed upon the bench and vigorously scoured and scraped. These minute precautions are taken because it is absolutely necessary to have the sheets clean, since dirt cannot be galvanized. The sheets are next thrown back into vats of water, and afterward immersed in vats of strong muriatic acid, which develop on the surface of the iron an affinity for the zinc. The sheets remain in the muriatic acid but a short time, and are soon removed and placed in a large drying oven, on cars, and as soon as a car load is dried it is run out to the galvanizing tank.

The latter is made of charcoal bloom iron about 1 inch in thickness, and is 4 feet deep by 23 inches wide and 11 feet long. Its capacity is therefore nearly 580 gallons. It is built in brick, being surrounded by 8 inches of fire brick and 16 inches of ordinary brick. These precautions must be taken, because the tank always contains from 50,000 to 60,000 lbs. of melted zinc. The tank burns out in six months, at the end of which time a new tank is built up in another place, and the melted zinc poured from the old one into the new one, for the molten metal is never allowed to solidify. About 25 plates, or about half a ton of spelter. is added to the mass every day. A partition dipping only a few inches below the top of the molten metal extends across the top of the tank. Upon one side of this partition, or strip, sal ammoniac is thrown upon the zinc, and on the other side is thrown sand, both materials floating on the surface, the partition preventing them from mixing.

The operation proceeds very regularly. One person on the sal ammoniae side of the tank akes the sheets of iron from the car on which they have been drawn from the oven, and immerses one at a time in the liquid metal. When the sheet is entirely under, he pushes its top edge over by means of a lever pivoted on the edge of the tank. Previous to inserting the sheet, the workman has a rod, terminating in a book in the metal, and as the sheet goes down below the surface its lower edge falls in the hook. The lever pushes over the top edge under the partition to the other side of the tank, and when this has been done the workman raises the sheet up a short distance with his hook. All this has for its object simply to keep hold of the iron while immersed in the zinc, as otherwise it might be difficult to find it when it had been passed to the other side of the tank. From the moment the sheet appears above the surface of the zinc the operation of raising it must be continued without stopping till it is entirely out of the bath, for if it stops for an instant a broad streak is left across its urface. Consequently, when the edge appears above the melted metal it is seized by two pairs of nippers, one of which is suspended to a pulley, and hoisted out of the bath. In passing out the sheet is cleaned by the sand floating on the surface of the metal. Four men can pass 50 bundles of sheet iron through the bath in eight hours. The sheet is next passed between three rolls to take out "the buckle," and afterward through the rolls again to straighten it.

Iron may be cheaply and quickly coated with zine by another process from that above described, which is advantageous for protecting small articles from rust. They are to be first cleansed by placing them in open wooden vessels, in water containing three-quarters to 1 per cent. of common sulphuric acid, and allowed to remain in it until the surface appears clean, or may be rendered so by scouring with a rag or wet sand. According to the amount of acid, L. C. Stephen's Patent Combination Rule. wet sand. According to 24 hours. Fresh acid must be added according to the extent of use and of the liquid. When this is saturated with sulphate of iron it must be renewed. After removal from this bath the articles are rinsed in fresh water, and scoured until they acquire a clean, metallic surface, and then kept in water in which a little slaked lime has been attreed until the next operation. When thus freed from rust, they are to be coated with a thin film of zinc while cold, by means of chloride of zinc, which may be made by filling a glazed earthen vessel of about two-thirds gallon capacity three-fourths full of muriatic acid, and adding zinc elippings until effervescence ceases. The liquid is then to be turned off from the andissolved zinc and preserved in a glass vessel. For use it is poured into a sheet zinc vessel of suitable size and shape for the objects, and about 1.80 per cent. of its weight

of finely powdered sal ammoniae added. The articles are then immersed in it, a scum of fine bubbles forming on the surface in from one to two minutes, indicative of the completion of the operation. The articles are next drained, so that the excess may flow back into the ves-The operation of galvanizing from as at present ordinarily performed may be described as film of zinc are placed on clean sheet from heatfollows: The sheets, which are prepared at the ed from beneath, and perfectly dried, and then dipped piece by plece, by means of tongs, into very hot (though not glowing) molten zinc for a short time, until they acquire the temperature of the zinc. They are then removed and beaten, to cause the excess of zine to fall off.

The Population of London.

The Registrar General of Great Britain has ecently published his annual summary of the births, deaths and causes of death in London and other large towns during the year 1876 :

The city had in that year, by estimate, 4,286-607 inhabitants, among whom 153,192 children were born and 91,171 persons of all ages died. The annual birth rate was 35.7; the death rate, 21.3 per 1000. The death rate in luner London was 22.3; in the outer ring, 17.3, or after correction for the deaths of persons not belonging to the outer ring in the two Middlesex asylums, 16.9. Thus at present the mortality of the population in the outer ring is low.

At the last census more than 100,000 men were enumerated in the professional class, including the House of Parliament, civil servants. officers of the navy and officers of the armythe latter in smaller numbers than are found in any other European capital-the clergy, lawyers, physicians, scientists, authors, editors, artists, teachers, civil engineers; 53,000 of the entertaining and domestic class were enumerated; 211,000 of the great commercial class, including bankers, merchants, clerks and their collaterals; the great transport class on railways, roads, rivers, canals, seas, warehouses; messengers and men in the telegraphic service; the agricultural class barely represented by 27,000, including land owners and a sprinkling of farmers, laborers, nurserymen and gardeners, as well as horse owners; the industrial class. the most numerous class of all, 505,000, including publishers and printers, musical instrument makers in thousands, litographers, wood carvers, watchmakers, philosophical instrument makers; engine and machine makers. 14,000, beside tool makers and cutlers; coach makers, 6000; saddlers, shipbuilders, archiects, surveyors, builders, carpenters and joiners, 32,000; bricklayers, 18,000; masons, plasterers, 6000; plumbers, painters and glaziers, 28,000; cabinet makers and upholsterers, 17,000; carvers and guilders, undertakers, manufacturing chemists and dyers, woolen, worsted, flax, cotton manufacturers very few ; silk, some 3000; mercers and drapers, 11,000; hair dressers, hatters, 3000; tailors, 24,000; shoemakers, 31,000; umbrella and stick makers, rope makers, cow keepers and milk sellers, 5000; butchers, 12,000; fishmongers, 4000; bakers and confectioners, 14,000; green grocers and fruiterers, 6000; brewers, 4000; wine and spirit merchants, 4000; grocers, 11,000; tobecconists, 5000; soap boilers, tallow chandlers, tanners and curriers, leather case makers, brush makers, 3000; oil and colormen, 3000; French polishers, 3000; timber merchants. sawyers, box and packing case makers, coopers, 5000; paper makers, stationers, 4000; coal merchants, coal heavers, 3000; men engaged in gas service, 3000; railway laborers, earthenware manufacturers, few; glass manufacturers, 3000; goldsmiths, silversmiths and jewelers, 7000; brass manufacturers and braziers, 4000; gas fitters, 3000; wire workers, iron manufacturers, 5000; whitesmiths, blacksmiths, 9000, and ironmongers 2000, and a multitude of other industrial workmen. Of laborers 65,000 were told, beside 35,000 in undefined employments.

Of women, several were authors, artists, actresses, musicians, schoolmistresses and governesses. In the domestic class 892,130 are wives that in many cases aid their husbands in business, but in the majority of cases they may be simply called housewives; then 226,000 are domestic servants; many keep inns and lodging houses; large numbers are shopkeepers or hawkers; bookbinding occupied large numbers (5000), so does ertificial flower making (4000). Out of the household, the three great occupations of women are making, mending and washing articles of dress. There were in 1871 15,000 tailoresses; 58,000 milliners and dress makers; 27,000 shirt makers and seamstresses; 5000 shoemakers and 44,000 lanndresses; 4000 box and packing case makers; 11,000 machinists. Only 29,000 are returned simply as gentlewomen.

It is quite edifying, says the Times, to read the comments of the London press on the wickedness of Americans who venture to discuss the question whether the European war is likely to aid American trade. "The Americans," we are kindly informed, "would do better to look at home than to look abroad." 'Their population, if they are not in too great a hurry, will find abundance of employment in further developing the internal resources of their vast and fertile country; but hopes founded on the necessities of a European war

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A New Direct Process

We have just received the following report by Prof. H. S. Osborn, of Miami University, Oxford, Ohio, on the process of reducing iron ores to malleable iron and steel, invented and uccessfully applied by Mr. Edgar Peckham, of Plattsburgh, N. Y .:

This process, in its principle, is the same which, apparently, has been adopted for ages past. It is doubtful that ancient nations knew anything of cast iron. Long before the Christian era, and in many lands the richest ores, particularly magnetic, though sometimes specular or red oxide ores, were reduced by heating in the presence of charcoal, but without melting the iron. The principle involved can be made apparent to those not particularly versed in metallurgic science. It is this: Magnetic ores are composed of iron in the com pound known as magnetic oxide, or chemically, proto-sesquioxide of iron-that is, they conslst of iron, combined with oxygen in two proportions, first, of one part of iron to one part of oxygen. This proportion is, in weight, as 56 of iron is to 16 of oxygen in a mass of 72 parts. This is the protoxide. The other oxide is known as the sesquioxide of iron, in which the proportion of iron to oxygen is as 2 to 3that is, the combining weight of iron being 56; 56 multiplied by 2 is 112, and that of oxygen being 16; 16 multiplied by 3 is 48. So that in pure magnetic iron ores we find iron in a state of a double combination, and in the only two compound states wherein oxygen alone is the companion of iron, namely, the protoxide or the one to one condition, and the sesquioxide of two to three condition.

The question here may be asked and answered, Why are the numbers 56 and 16 used as the combining numbers of iron (56) and of oxygen (16)? Simply because it has been found that whenever iron chemically combines with any other element, as oxygen, chlorine, sulphur, &c., to form a compound, it always combines in the proportion of 56 parts of the entire compound; and so of oxygen, we have only to say that it combines, in all purely chemical compounds of that element, in the proportion of 16.

This law of affinity is not to be explained any nore than is the law of gravitation. No two elements have the same combining number. Sulphur has 32, phosphorus has 31, &c. So that in 100 lbs. of pure protoxide of iron the 100 lbs. is entirely divided between iron and oxygen in the proportion of 56 to 16-that is, there will be-

77 77 of iron 22 22 of oxygen

99-99 or one hundred In a pure magnetic ore (or combination of the last mentioned ore (protoxide), and the 2 iron to 3 oxygen ore or sesquioxide), the proportion would require that a 100 lbs, be divided between iron and oxygen in the proportion of 168 to 64, for there would be 3 irons, or 56 multiplied by 3, equal to 168, and 4 oxygens or 64. The 100 lbs. of magnetic ore, if absolutely pure, would have 72.41 lbs. of iron, 27.58 of oxygen. This is the type of the ore of Lake Champlain.

states of purity, none being absolutely pure. THE PRINCIPLE INVOLVED

The magnetic ore exists, however, in different

in the process of working this magnetic ore is one in which the attempt is to deprive the iron of its companion oxygen. It has been known for ages that charcoal would deprive iron ore of its oxygen, provided the crushed ore was heated ong enough at a low red heat with abundance of charcoal. Under these circumstances the oxygen gradually leaves the magnetic oxide, uniter with the charcoal, and forms both carbonic oxide and carbonic acid, both of which, being gases, pass off; the former is inflammable burning with a lambent blue flame; the latter not only incombustible, but extinguishing flame. The iron ore, therefore, is reduced to metallic iron without being melted, the heat being only sufficient to reduce the iron to that soft and weldable condition called " pasty," in which all the parts combine to form the ball, or "loup." Now, the ore frequently contains other substances beside iron and oxygen. One of these substances is quartz, or silex, occurring either in small grains, as in many of the magnetic ores of Lake Champlain, especially the Old Cheever bed, or in composition. Beside silex, these magnetic ores contain alumina, the base of clay, also magnesia, lime, &c. These ingredients may combine with the metal in the process of reducing the ore to iron. They will take up more or less iron and become entangled with the metallic iron mass itself, and must be squeezed or hammered out. By far the larger portion of these ingredients melt, and, being lighter than the iron, they cover the iron in the fire, and are drawn off in the form of

Moseley Iron Bridge & Roof Co., the iron in the ore, as far as possible, then to

of the ore, it may then combine with the iron times for reduction, as before described.

itself and form steel, if less than 2 per cent. of In a certain high heat of a bright cherry red, carbon is absorbed. If the iron absorbs more than 2 per cent. of carbon it will become cast glomerate at their surfaces, and with a still iron, a fact which takes place in the blast furnace. If the ore contains a sufficient amount though in the condition of partly deoxidated of manganese, it may take up more than 4 per cent. of carbon and form the crystalline metal the close of which time it retained oxygen, and called spiegeleisen. But in the Catalan forges generally, and in Mr. Peckham's process, this glomerated. These trials were continued 24 highest absorption of carbon does not occur.

THE FIRST ECONOMY is in mixing the ore with the charcoal in a still being exidized the assay was finally reproper manner and in sufficient quantity. By magnetic ores which I have examined, the pro- The same kind of raw ore was again placed in portion most favorable is, in bulk, 11/4 part of the crucible, the heat reduced to about 1100° small shot. This is for hard coal made from with better results, but to some degree it was oak, maple and similar woods. For hemlock and pine, 1% or 2 to 1 of ore. Theoretically, this is more than enough to reduce the ore to metallic iron, but after many trials I find that the most rapid and satisfactory results, in crucibles of various sizes, placed vertically and horizontally, call for the above working proportions. ton of pure magnetic ore may 551.7 lbs. pure oxygen, which would require 206.9 lbs. of pure carbon for the entire elimination of the exygen in converting it into carbonic acid gas. If the charcoal weighs 20 lbs. and the ore 300 lbs. to the bushel, then it would require about 12 cubic ft. of coal to 6 cubic ft. but such is not the case even in the best of ores and of coals.

THE SECOND ECONOMY is to be found in the condition of the charcoal.

The practice of exposing the coal to the weather adds to its weight, at the very least, from 7 to 10 lbs. to every 100 lbs. In this and a worse condition it is frequently used. The loss is brought about, first, by the heat absorbed into the vapor and carried off as latent. From repeated experiments it is supposed that 300 bushels of charcoal, containing of about 272 bushels of pine coal, thoroughly dry and seasoned, and we may suppose the to high. ratio about the same in other charcoals. In a forge of six fires, turning out six tons of iron a day, the saving for a working year of only 200 days, supposing that 28 bushels were saved per ton and that coal cost only 7 cents per forges which, from my personal examination, mmediately after it had been taken from the it is quite probable, that charcoal which has been carefully kept away from the weather, in fire-proof sheds into which it has been put immediately after leaving the kiln and allowed to remain some weeks before using, absorbs oxygen and other helpful gases. One cubic foot of charcoal, especially hard coal, will absorb 10 cubic feet of oxygen under certain circumstances. But aside of the theory, charcoal which has been thus seasoned and carefully protected, is, by the best and most experienced operators, always found to work better. It nay also improve the quality, but it certainly economy to keep coal ahead of the quantity demanded.

THE THIRD ECONOMY

exists in properly utilizing the waste heat from the forges. This economy is, well studied in the manner in which the most recent form of Mr. Peckham's furnace flues have been arranged. The essential element in the plan is to use the waste heat so that it shall be distributed around the deoxygenated ore up to the extreme moment of its delivery upon the fire of the hearth. The heat of the ore when allowed to cool, is doubly lost, first, because it requires additional coal to recover the heat, and secondly, because of the rapid reoxygenation of the ore, which having now become spongy (each particle being filled by countless pores) is ready to absorb oxygen from the air, and then it requires reduction again. In the management of this waste heat, and delivery of the treated ore to the hearth, Mr. Peckham's plan is not surpassed by any process yet adopted. From an experiment performed upon the magnetic ore crushed ready for deoxygenation, being the very same kind used in the forges near Platts burg, N. Y., I found when reducing the ores by charcoal that the assay which had been arrested in its progress by removal, cooling and exposure to the air, required about one hour longer to bring it to the same condition as the others not so treated, even after the original

Rising Fawn, Chattanooga & Cherokee long time in the air-tight chambers with char-

after about 21/2 hours, the grains begin to agwas not reduced to good metallic iron, but aghours at one trial. The ore was then examined. and then it was heated 8 hours longer, when repeated experiments it appears that in the heat, had prevented the action of the charcoal. coal to 1 part of ore reduced to the size of Fah. the ore heated at that heat for 24 hours vet glazed and not reduced. The next assay was performed with a crucible made for the purpose, and in such a way that the heat could be regulated, the crucible being placed horizontally. The first heat of six hours was not more than 900° Fah., not even raised to a red heat, but on the verge of red, the utmost care eing used to prevent red heat. After six hours of this carefully regulated heat, the test showed that the sulphur of the ore had almost entirely been roasted off-the natural glazing had disappeared, and no heat glaze added-the ore had ost strength of about 11/4 per cent., due to the escape of moieture and other volatile matter. of ore to complete a reduction, on the condition that all the parts were chemically pure, heat and continued six hours more. The ore was largely deoxidized; it was porous through and through, and weight greatly decreased. The heat was then very slightly increased for two hours; the ore was in part soft and thoroughly sectile. One hour more at the same heat, all the smaller parts were thoroughly reduced to metallic fron, and the larger so nearly so that it was continued only one half hour longer; all the ore reduced, but fragments evionsumed in drying it, and second by the heat dently over carbonized. Time, 151/4 hours, of which time the roasting was continued during six bours at lower than red heat, or about 900' Fab. We do not believe, in practical work, any 10 per cent. water, are required to do the work plan can improve on Mr. Peckham's, provided the temperatures be strictly observed from low

therefore, is to be found in heating according to the size of the ore, about 14 hours for a magnetic ore of 4.6 to 5.2 specific gravity, and of size averaging about one quarter inch to bushel, would amount to an annual saving of one-eighth, at a very low red heat, beginning \$2300. Hemlock charcoal has been used in thus and continuing about 5 to 6 hours at that heat just before reddening the ore, increasing afterward to full red. The wrong method consists in reddening, or heating, so high as to coal heap, lost as much as 18 per cent. of weight by thorough drying. There is great glaze the surface of the ore at first, by which is economy even in this respect. But still further, formed a certain silicate of iron almost impervious to penetration of the escaping elements which it is desirable should be eliminated. The injury done is several fold; first, in requiring more combustion of coal; second, in never completely eliminating injurious elements; third, in the inequality of the ore, for it is brought down to the hearth in unequal condition most certainly resulting in poor metal, as a whole, or poor in some particular parts, rendering the billets uneven in quality, so that the iron or steel becomes untrustworthy, and the brand is injured in the market; fourth, in a loss of ore, which will be proreduces the proportion of coal needed. It is portioned to the time that the cre is exposed to too high a heat, a result occurring in many forges and processes every day. There is no work more important than that which has to do with the uniform condition and proper management of the ore in the crucibles or heating chambers of the forge.

By repeated and continued experiments extending over a period of more than ten years, Mr. Peckham has found out and proved by practice, that all of the previous described conomies are absolutely necessary to the economical manufacture of the best quality of wrought iron directly from the ore at one opwrought iron directly from the ore at one operation. And he has succeeded in inventing and putting into use a furnace which, from my personal examination when in operation, seems to be all that can be desired. The plan adopted by Mr. Peckham is one of three stories, or retorts, with flues on each side, provided with dampers so arranged that each crucible, or retort, may be kept at a uniform and at any desired heat. Each crucible, or retort, and flue, is provided with a door in its rear or back end. This enables the careful manager not only to determine the degree of heat, but, also, if he chooses, to examine the ore as to its progress chooses, to examine the ore as to its progress in deoxidation. He can either continue the heat or draw the ore down to the next lower story, or crucible, on its way to the inclined plane, or floor, along which the ore is conveyed when deoxidized, to the hearth, or fire, without exposure to the cold air.

When running continuously on the same ore, and when the quantity of carbon and time required for deoxidation are determined, the workman has no excuse for not keeping the retorts, or crucibles, uniformly at the desired heat, and producing a uniformly and thores. chooses, to examine the ore as to its progress

and, being lighter than the iron, they cover the iron in the fire, and are drawn off in the form of a black heavy liquid known as "cinder," or slag.

WHAT IS DESIRED, therefore, is to get rid of all the associations of the iron in the ore, as far as possible, then to agglomerate the detached and small particles of metallic iron quickly, that the charcoal may be aved as much as possible, and that these operations may be performed upon the largest quantity and in the shortest possible time. In order to study

THE ECONOMIES of this process it must be remembered that the oxygen will take up only a certain amount of the carbon of the charcoal, and the remaining charcoal, if entirely excluded from the air, will remain unconsumed without regard to the length of time it is heated red bot. So that in the first change of theore, in firs reduction from ore to iron, no loss of charcoal may be anticle pated because of keeping the crushed or a long time in the air-tight chambers with charcoal in the process of extracting the oxygen. In theory it is true that the charcoal will first combine with the oxygen of the iron oxide, as we have said, but after taking up all the oxygen of the ore, it may then combine with the from of the ore, it may then combine with the from 4.6 to 5.9, requires different times for reduction, as before described.

The condition of the charcoal will first combine with the oxygen of the iron oxide, as we have said, but after taking up all the oxygen of the ore, it may then combine with the first change of the ore, it is reduction from ore to iron, no loss of charcoal may be anticle pated because of keeping the crushed or as inch, mixed with charcoal crushed to about the size of small peas, or less, say about one-eighth of an ore.

The raw ore broken down to about the size of small peas, or less, say about one-eighth of an ore.

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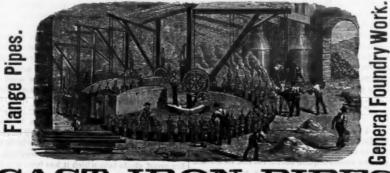
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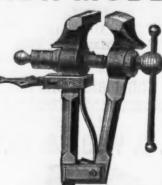
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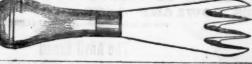
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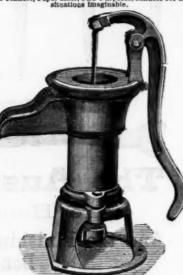
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Report of the Judges of Group 15.

(Continued.) The following is a transcript of the official

report of the Judges of Group 15, Centennial Exhibition, including hardware:

International Exhibition, 1876, United States Centennial Commission Bureau of Awards, Group 15, Philadelphia, June 26, 1876.

Judges met at 9 o'clock a. m. at room, and from thence proceeded to Main Building, to continue examinations of United States deposits; as follows:

posits; as follows:

270. Eagle Lock Co., Terryville, Conn. Till, cupboard and other locks, in great variety, and of superior quality of workmanship. Recommended for award of merit.

271. J. E. Straus & Co., Philadelphia, Pa. Galvanized hods, chains, nails and kitchen utensits; excellently well done. Recommended for sward of merit.

272. Will & Finck, San Francisco, Cal. Table cutlery. &c.: substantial and well finished

cutlery, &c.; substantial and well finished goods, tasteful in patterns. Recommended

cutlery, &c.; substantial and well finished goods, tasteful in patterns. Recommended for award of merit.

273. Darling, Brown & Sharp, Providence, R. I. Steel squares, rules, &c.; a large variety, very correctly marked and beautifully made. Recommended for award of merit.

274. Benedict & Burnham Mfg. Co., Waterbury, Conn. Rolled brass and copper, brass and copper wire, brass chains, brass hinges, door handles, &c.; a large and elegant display of very superior goods. Recommended for award of merit.

275. Holmes, Booth & Hayden, Waterbury, Conn. Brass and copper rolled sheets and wire, copper tacks, rivets, German silver forks and spoons, &c.; a very large assortment of superior goods, well finished; the forks especially fine. Recommended for award of merit.

276. Lewis, Oliver & Phillips, Pittsburgh, Pa. Wagon hardware, strap and T hinges, screw bolts, &c.; very well made and of excellent quality. Recommended for award of merit.

278. E. & G. Brooke, Birdsboro', Pa. Nails, brads and spikes; clean and neatly mude, good quality and well proportioned. Recommended for award of merit.

280. Dunbar, Hobart & Co., South Abington, Mass, Tacks, trunk and clout nails, heel and toe plates for shoes, &c.; well made and of good quality. Recommended for award of merit.

ment.
281. Holly Mfg. Co., Lakeville, Conn. Pocket
cutlery; a very fine display of excellent styles
and finish. Recommended for award of

merit. 285. Penn Galvanic Works, Philadelphia, Pa. Galvanized ship hardware, &c.; work excel-lently well done. Recommended for award Judges adjourned, to meet to-morrow. 27th

net., at 9 o'clock a. m. at room. Philadelphia, June 27, 1876.

Judges met at 9 o'clock at hall, and proceeded to examine some newly reported deposits in Foreign Department, after which the United States deposits were continued in Main

United States deposits were continued in Main Building.
290. Henry Ottomon Freidrich, Buifeldt, Swartzenburg, Germany. Spoons, forks, &c., of tinned iron; very cheap and well made. Recommended for award of merit.
297. Riverside Iron Works, Wheeling, West Virginia. Cut nails; a full assortment of very neatly cut, well shaped nails of good material. Recommended for award of merit.
298. Quaker City Stencil Works, Philadelphia, Pa. Cast letters, signs, badges, &c.; very neat and pretty designs, well executed. Recommended for award of merit.
302. William E. Quigley, Waterbury, Conn. Horseshoes of most excellent quality and finish. Recommended for award of merit. In view of the preparation of the reports to

In view of the preparation of the reports to the commission, it was esteemed necessary to secure clerical aid, and by resolution it was determined to employ Mr. H. K. Steinmetz as clerk to the group No. 15, and it was further resolved to request the chief of bureau of awards, Gen. Walker, to approve and confirm the action in the employment of said clerk, which confirmation being had, Mr. Steinmetz was notified to be in attendance to-morrow, 28th inst. Judges adjourned to meet at 9 a. m.

PHILADELPHIA, June 28, 1876. Judges met at room at 9 o'clock, a. m., Mr. H. K. Steinmetz being present in accordance with notice of yesterday, to enter upon the duties of clerk. Judges proceeded to examine deposits in Agricultural Hall as follows:

posite in Agricultural Hall as follows:
304. H. Burden & Sons, Troy, N. Y. A great
variety of machine-made horse and mule
shoes; exceedingly well made and of very
hest quality of iron and best shapes. Recommended for award of merit.
305. William Russell, Cincinnati, Ohio. Handmade and machine-made horseshoes, machine
made shoes of fair quality; hand-made shoes
finished for exhibition. A variety of shoes
for remedying defects in hoofs, also patented
rolled iron for hand-shoe making, all highly
meritorious. Recommended for award of
merit. merit. 306. Rhode Island Horseshoe Co., Providence,

306. Rhode Island Horseshoe Co., Providence, R. I. Patent machine-hammered horseshoes, made from selected scrap iron, of good shape and finish; first-class goods in every respect. Recommended for award of merit.
307. Aaron W. Smith, Manchester, N. H. Patent flexible horseshoes; a valuable invention of much practical science. Recommended for award of merit.
310. S. S. Putnam & Co., Neponsett, Mass. Hammer pointed horse nails; a large exhibit of good, well made nails of superior quality. Recommended for award of merit.
313. National Horse Nail Co., Vergennes, Vt. Machine-made horse nails, plain and polished; excellently well made, uniform and of good material. Recommended for award of merit.
Judges adjourned to meet to-morrow, 29th Judges adjourned to meet to-morrow, 29th

PHILADELPHIA, June 29, 1876. Judges met at hall at 9 o'clock a. m. and proeeded to make examinations of deposits in Machinery Hall.

for award of merit, 22. Freeman K. Libby, Waltham, Mass. Em-ory and crocus paper; of excellent quality; a highly meritorious article. Recommended for award of merit.

22. Post & Co., Cincinnati, Ohio. Car Door locks, padlocks, lingges, &c., brass and plated; excellently and carefully fitted; well adapted for use. Recommended for award

of merit. 26. L. Sykes & Son, Philadelphia, Pa. Nuts, botts, turn buckles, washers, &c.; excellent goods and well made. Recommended for award of merit.

award of merit.

28. Enterprise Mfg. Co., Philadelphia, Pa.
Patent sad irons (cold handles), coffee mills
(large and small), tobacco cutters, small
castings, &c.; a large assortment of useful
articles of improved styles. Recommended
for sward of merit.

29. Eben Moody Boynton, New York. Saws
in extensive variety, tools and files, special
patent "lightning saws;" very superior saws
of great utility. Recommended for award of
merit.

Stephens Patent Vise Co., New York.

Parallel vises and planer chucks; a large assortment of patent lever vises, useful tools of ingenious construction. Recommended for award of parallel vises and planer chucks; a large assortment of patent lever vises, useful tools of ingenious construction.

ingenious construction. Recommended for award of merit.

32. Western File Works, Beaver Falls, Pa. Files, rasps, &c.; well cut, handsome goods. Recommended for award of merit.

33. Fisher & Norris, Eagle Anvil Works, Trenton, N. J. Anvils, vises, &c., cast iron steel faced anvils of excellent quality, specially commended. Recommended for award of merit.

34. McCaffrey Bros., Philadelphia, Pa. Hand-cut files and rasps; a large exhibit of superior goods. Recommended for award of

merit.
355. G. & H. Barnett, Black Diamond Works,
Philadelphia, Pa. Hand-cut files and rasps;
very superior goods. Recommended for
award of merit.
357. Douglass Mfg. Co., Seymour, Conu.
Chisels, augers, auger bits, draw knives, &c.;
very fine goods, highly finished and of superior workmanship. Recommended for
award of merit.
359. W. J. Flanigan & Co., Philadelphia, Pa.
Samson wrenches. A very valuable vet sim-

Samson wrenches. A very valuable yet simple invention. Recommended for award of

merit.
340. H. Hammond & Co., Hartford, Conn.
Steel hammers and drop forgings; first-class
goods. Recommended for award of merit.
343. J. H. Sternbergh, Reading, Pa. Bolts,
nuts, &c.; a large assortment of sizes for a
great variety of purposes, of very good quality. Recommended for award of merit.
345. A. G. Coes & Co., Worcester, Mass.
Screw wrenches; first-class goods, cheap
in prices. Recommended for award of
merit.

Merit.

46. Morse Twist Drill and Machine Co., New Bedford, Mass. Screw plates, wrenches, stocks and dies, chucks, reamers, &c.; Specially commended for accuracy and superiority of finish. Recommended for award of merit.

Judges adjourned to meet to-morrow at 9 s

PHILADELPHIA, June 30, 1876. Judges met at hall at 9 o'clock a. m. and roceeded to Machinery Hall to continue in-

spection of deposits; as follows: 350. W. C. Allison & Co., Philadelphia, Pa Bolts, nuts, screws, &c.; a great variety of very superior goods in all respects. Recom-

Boits, nuts, screws, &c.; a great variety of very superior goods in all respects. Recommended for award of merit.

551. Hoopes & Townsend, Philadelphia, Pa. Boits, nuts, screws, rivets, &c., in great variety; of excellent workmanship and quality of material, first class in all particulars. Recommended for award of merit.

52. Pennsylvania Tack Works, Norristown, Pa. Tacks, shoe nails, &c., copper and iron also galvanized; most excellent goods. Recommended for award of merit.

55. American Saw Company, Trenton, N. J. Circular, mill and cross-cut saws, well finished and well adapted to use. Recommended for award of merit.

58. Edward H. Knight, Philadelphia, Pa. Patent wrench (adjustable); a very useful and labor-saving invention. Recommended for award of merit.

561. J. M. Carpenter, Pawtucket, R. I. Stocks with taps and Dies; extremely well finished. Recommended for award of merit.

Judges adjourned to meet on Wednesday

Judges adjourned to meet on Wednesday next. July 5th, at 9 a. m., at room, it being un-

derstood the intervening days, to wit, 1st, 2d, 3d and 4th of July, would partake of the character of a holiday. Judges met at 9 o'clock a. m. at room.

Specimens of horseshoes and horseshoe nails were further tested at request of depositors, after which judges proceeded to visit Annex to Main Building to examine deposit of-

363. Charles Parker, Meriden Conn. Box and board coffee mills; a large variety of samples of mills; plain goods, well adapted for common use.

After fitting judges adjourned to meet to-morrow, 6th inst., at room at 9 a. m.

War Ships and Torpedoes.

Mr. E. J. Reed, the well known British naval architect, delivered a lecture in London a few days ago, before the Society of Arts, which will be apt to make the English people uncomfortable as to the vast annual expenditures of the government in maintaining a great naval establishment. After reviewing the progress of naval architecture for the past twenty years, Mr. Reed concluded as follows:

It will be expected in conclusion that I shall say something of the future aspect of the subject. I cannot help myself feeling that we have already in some respects shown signs of weakness and want of clear purpose of resist-Machinery Hall.

319. Henry Disston & Sons, Philadelphia, Pa.
Saws of every description; tools for keeping saws in order; brick and plastering trowels, molders' tools, plumbs and levels, butt hinges, saw files, &cc.; a very large display of the above goods; the saws especially of surpassing excellence of material, style and finish; every article worthy the highest commendation. Recommended for award of merit.

320. Nicholson File Co., Providence, R. I. A large exhibit of machine-made files and rasps of all sizes and descriptions; exceedingly well cut and of excellent material. Recommended for award of merit. ing even the attack of the gun, and that some of moderate increase of subdivision in the lower parts of a ship, no great effort has yet been clad frigate Alexandra. When coiled it ocmended for award of merit.

321. S. G. Flagg & Co., Philadelphia, Pa. Steel, gray iron and malleable iron castings; also plain and galvanized pipe fittings; a fine display of excellent castings; the steel castings

especially of superior quality. Recommended it has to receive, in my belief, a solution totally different from any which has yet been publicly attempted. Neither the suspension of chain nets nor additional bulkhead division in ordinary forms of ships will be a sufficient 23. Benjamin Forstner, Salem, Oregon. Patent perpetual lip auger bit; an lugenious and most useful tool. Recommended for award or anything like a sufficient defense against No doubt it is an instrument to the use of which many chances of warfare at sea are averse, and it is one which is utterly unavailabie as a means of attacking the shore. But, on the other hand, as a means of attacking ships, it is of the most formidable character. The naval Whitehead torpedo delivers a terrible blow. It moves for the space of some hundreds of yards with a speed double that of the fastest iron-clads; its path is so sure and true that at that distance a second torpedo can be made to pass through the hole which a first has made; and, whereas, it has been assumed that in ordinary conditions of weather and naval warfare under steam, a ship could not have more than a few feet of her depth below water attacked, the torpedo has the whole immersed bottom of the ship exposed to its assaults. In the Sultan, for example, while the side to the depth of six feet below the water presents to shot and shell an area of less than 2000 square feet, the surface presented to torpedo attack is about 8000 square feet. In view of these facts I have been deeply studying the effects of the torpedo upon the forms of ships, and I have already come to the conclusion that, while in existing ships, and especially in existing large ships, which are more or less unwieldy, chain-net protections and internal subdivisions and modifications of stowage must be resorted to as far as possible, and while also in action such ships must be kept under steam and under the helm to the utmost practicable extent, as regards the future no such ships must be built. Small fron-clads of great breadth and short length can be made so handy as to find in their own agility-associated with such modifications of form as are necessary even for them -sufficient security against torpedo attack. But in the case of line-of-battle ships a total change of form is necessary to meet the torpedo, and the days are already numbered of war ships more or less long and narrow, and with deep bottoms of thin iron, containing the steam boilers and powder magazines.

I should like to speak of many other changes

which must be made in the ships of war in the future. Some of them may be foreseen distinctly enough, and only want of time forbids me from forecasting a few of them for your information. But the torpedo question, which has already absorbed so much of our time, has yet another aspect which is of such immense importance to us as a nation that I cannot pass it over. I am quite aware that the public must be getting tired of this war ship question, and of its continual change and progress, and, to tell the truth, I expect to see it fall more or less out of the public mind and out of the public interest from sheer fatigue of pursuing its trouble ome transformations. I am myself not a little tired of it, and yet I must endeavor to do my duty in it still. The serious fact in this torpedo matter is the cheapness and facility with which the new weapon can be turned against us. In former days, during all the ages from the invention of gunpowder down to to-day, increased offensive naval power has only been obtainable by increased size of gun, which has carried with it a thousand other increases of cost and of difficulty. Even of late, when the gun has grown to such gigantic proportions, alhough we at first eight shrink from its conequences, we soon steady ourselves with the recollection that such guns cost enormous sums of money themselves; that they can only be worked by means of steam and hydraulic appliances, more costly still; that they can only be carried with speed at sea in steamships of a yet far more costly character; that when the whole mighty engine-ship, gun and all other appliances-is at length produced, they can only be made available by exercise and practice for the acquirement of skill by means of still further outlay for fuel, for powder and for shot and shell; and, in short, that the bringing of blg guns against our big guns at sea in suitable ships is a game of lavish expenditure and extravagance which but very few, indeed, of the powers even of Europe can afford to engage in upon a scale commensurate with our own. But the torpedo is a weapon of offense differing altogether from a gun in all these respects. for although each torpedo itself costs from £400 to £500, it can be discharged from almost any ship or boat whatever, and the fittings for discharging it are of an inexpensive nature. Here, then, we have every power furnished with the means of attacking our large war ships so cheap and so simple that few powers are too petty or too impecunious to provide them on an emergency, while the larger powers could, with the financial means at their disposal, completely compass and surround our few largest and finest ships with those agents of destruction. In my opinion, this state of things imposes altogether new and solemn obligations upon our naval administrators, and the objects to which it points are clearly twofold-first, the construction of our large ships on principles which make them as little destructible by torpedoes as by guns, which I believe to be quite possible; and, secondly, the

A steel wire hawser, 150 fathoms long and 11/4 tons in weight, has been supplied to the iron-

building of all other war ships of small and handy types, and with the necessary improve-

be placed in a position of serious disadvantage and danger; with these wisely and scientifically

attended to, Britannia may in the coming days,

as in the past, continue to rule the waves.

With these objects neglected, we shall

USE THE BEST.

Pawtucket, R. I.

The American File Company have the exclusive right to use the Bernot process for cutting files. By this method all the dvantages of hand cutting are secured, together with an accuracy unattainable in hand work. They are the only manufacturers who employ machinery for testing files and steel.

Goods of all known manufacturers have been repeatedly tested, and interesting tables have been compiled showing the working qualities of files made by different makers, and of files made from different steels, and with various shapes and angles of tooth. They have thus reduced the manufacture of files to an exactness and perfection with a uniformity of result, as they believe, never before attained No file, foreign or domestic, that they have ever tested, has equalled the performances of their own goods taken at random from their stock. Their machines are capable of the most delicate adjustment, and can produce the very finest work known to the trade. Special files made to order. Prominent file manufacturers are having their best goods from our works. Price lists and information furnished on application.

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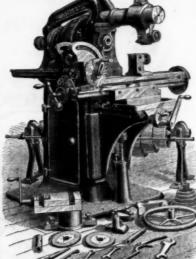
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This Machine has been designed especially to meet the wants of Steam Engine and Locomotive Builders, and others engaged in the manufacture of heavy Machinery and Tools.

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BROWN & SHARPE MFG. CO., Providence, R. I.

The Hardware and Agricultural Im- as we do, we should make some progress in plement Interests of San Francisco.

The San Francisco Journal of Commerce says : The value of the agricultural machinery imported yearly to the Pacific coast cannot be less than \$3,000,000 per annum, while the value of that manufactured in the United States cannot be less than \$70,000,000. The following table, compiled from the census of 1870, shows the eading states that manufacture agricultural implements :

State.

The other states did not manufacture to the value of \$3,000,000 between them. It will be noticed that, leaving out New York, the principal seat of manufacture is in the great states of the West. Ohio takes the lead; next to her comes the Empire State, and then Illinois. In fact, the Western States produce about three-fifths of the whole. California is beginning to assume some importance in this connec tion, and there are several plow factories in the interior of the State—at Napa, and San Leandro—which have turned out considerable quantities during the past three or four years. Yet, as whole, it may be said that our supplies of agri-cultural machinery are imported. For the past four years, taking good seasons with bad ones, the agricultural implement dealers have done very well. During the present year they have imported but slightly, owing to the crops falling short; yet the prospects for the trade are grow-ing better, owing to the advance in prices of wheat and other grain. Should, as now seems inevitable, war ensue between Russia and Turkey, wheat will certainly reach \$3, so that a two-thirds crop will be fully as profitable as a whole one last year. In this contingency farmers will undoubtedly feel encouraged to buy, more especially as next year is likely to be a good crop one, and as the war, once started, will last for at least two or three years.

The hardware trade of the city and coast has on the whole, been very profitable. The quick settlement of the country since 1860, and, indeed, 1870, and the correspondingly rapid advance of the cities and towns, especially of San Francisco, has created a great and neces sary demand for building, and, indeed, hardware of all kinds. The statistics of the trade on the coast, outside of the nail trade, are not very easy to obtain, inasmuch as, until the past year or so, they have never been systematically kept. In 1876, however, the Journal of Com merce kept them throughout the year. The im-

portations of 1876 were	as lonows :
No. Barrels. 1,441 Boxes. 17,599 Cases. 11,451 Casks. 352 Pieces 3,563	Crates No. 2 Hogsheads 2 Kegs 35,600 Packages 39,814

The value of this was \$3,000,000.

The quantity imported has not increased regularly from year to year, being subject to cou siderable fluctuations, but the quantity entering into consumption has, on the whole, steadily increased, and has doubled during the past ter years. The greatest demand for building hardware ever known was in 1875, but the sales in the country of hardware of various kinds was probably greater in 1876 than in any preceding

The hardware business is generally regarded as a highly profitable branch of trade; facts are quite the reverse. In the first decade after the discovery of gold it was no doubt highly emunerative, as was nearly every branch of husiness: but since 1860 a marked change has ensued, and profits have been gradually shrink ing until most of the pioneer firms have had to succumb, leaving the business entirely in the hands of their younger rivals.

The nail trade of San Francisco has, on the whole, steadily increased for the past 14 years. The greatest importations of any one year were in 1875, when 229,749 kegs were imported; but this was nearly approached in 1872, when 225, 000 kegs were imported. The consumption has doubled, on the whole, during the past 14 years, though the increase has not been uniform. It fell off in 1865 from the two preceding years, fell off similarly in 1869, and still more in 1870. It fell off in 1873 and again in 1876. This year the consumption has as yet been small, but the fall trade will no doubt make up for the lightness of the spring. Imports, con sumption, etc., for 14 years have been as followe:

Year.	Importe.	On the way Dec. 31.	Stock Dec. 31.	Supply for th year.	Consumption per year.	Consumption permonth.
1863	95,000	48,968	60,000	161,000	105,000	8,750
1864	94,361	20,008	40,000	161,361	114,361	9,580
1865	70,346	28,862		110,346		7,112
1866	108,068	58,343		128,968		10,709
1867	190,831	44,370		196,831		12,655
1868	158,208	48,396		203,208		14,267
1869	170,612	84,627		202,612		12,890
1870	103,869	40,702		151,800		10,659
1871	150,212	66,852		175,212		13,476
1872	225,000	45,963		238,500		15,548
1873	129,000	30,000		182,000		12,500
1874	214,964	47,923		246,964		18,947
1875	229,749	60,166			222,749	18,562
1876	163,700	79,764	9,000	198,700	189,700	15,806

many years. It may strike the reflecting reader do not work so hot as on other days of the that, using such large quantities of hardware

manufacturing. Our work in this direction has, however, been extremely slow. We make steel tools, saws, chains, cutlery, electrical instruments, etc., of about the following value yearly :

Chains 1 10 7,000 10,000 12,000 25,000 Screws and bolte . . . 2 19 35,000 30,000 37,500 60,000

Total...16 199 \$149,000 \$223,600 \$259,500 \$629,000 These are few and of comparatively small production, but they may be regarded as the nuclei of the manufacturing establishments of the future. San Francisco is the center of a vast future trade, and when the iron mines of the Pacific coast have been properly developed, she will manufacture vast quantities of bardware, which will find its way to the islands and coasts of the Pacific. At present our export trade in hardware and agricultural implements is comparatively light, but, with the increase of our foreign trade and with manufactures, it will develop in a ratio that will surprise our merchants of to-day. China, Japan, Australia and New Zealand, the islands of the Pacific and of the Indo-Chinese Archipelago, Central America, Mexico, Columbia, Peru and Chili, are so many inviting fields with which the industry of our merchants will be rewarded by attending to, by and by.

Comparative Experimental Tests With Steam Boilers Heated by Reverberatory Furnaces.

BY S. F. GATES, M. E.

These tests were made at the request of Mr. H. H. Gilmore, superintendent Boston Rolling Mills, Cambridgeport, Mass., and were of two boilers and furnaces which were erected during the year 1866, and regularly used since that The boilers are plain, tubular, each 15 feet long by 5 feet diameter, having 46 lapwelded tubes 4 inches diameter, set in brickwork in exactly the same manner and side by side. Near the front end of each boiler, and on one side of the brickwork casing, enter the flues from the reverberatory furnaces, which latter extend at right angles into the mill. The boilers are on the same level or plane as the hearths of the furnices, and each furnace has a stack. One of these reverberatory furnaces is the same as it was originally built, with the common single grate, having an area of 15.7 feet, its fire bridge being 18 feet distant from the center of its boiler. Bituminous coal of good quality was used as fuel.

The products of combustion pass the bridge wall along the hearth of the furnace, to heat the iron for the rolls, and through the flue under the boiler, traversing its entire length, and return through the tubes to the stack. Into the ash pits of the reverberatory furnaces is conducted a blast of air from a fan blower, and the air is forced up between the grate bars and agitates the fire, thus increasing the combus-tion of the coal. In this respect both furnaces are alike. The flame or gases and heat from these furnaces and others, generate the steam for running the several steam engines within

the mill.

The other reverberatory furnace embraced in these tests has the improved double fire chamber, patented by Mr. Gilmore, Feb. 23, 1875, and built therein about 30 mouths ago. The grates to this furnace are each 22x48 inches, giving 14.7 square feet for both, with a separate stoke hole to each fire chamber. The products of combustion of one division pass over the other division, and the smoke and gases are intermingled in the top of the fire chambers, creating a clear, white flame, which passes over the working bridge of the furnace, heating iron for the rolls, and thence to the boiler, as in the other instance. The intermediate fire chamber is not fed with coal as often as the other, and this thin firing admits more air to pass up through the fuel to aid combustion than is practicable with a single grate.

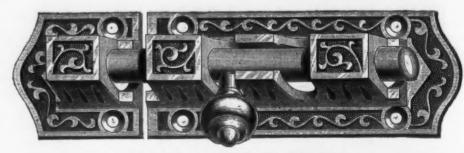
The flame from the double grate furnace, although 4 feet further from the boiler than the other from its boiler, was nearly white and very clear, traversing nearly the entire length of the on the bottom while from grate furnace the flame was yellowish and clouded with smoke, except when the heats on the iron were up and ready to draw. There was no special care taken to clean the heating surfaces or tubes of either boiler-no favors to one over the other-but were taken just as they are in every day use. The single grate furnace heated about one ton less of iron during the day than the double grate. Three tests were made. The first with the

double grate furnace, on Wednesday, May 2, 1877, when it rained steadily all day; coal as wheeled in from the wharf, very wet. The second test was with the single grate, Thursday, May 3, when it rained during forenoon, and the coal was wet as on previous day, except during afternoon. The third trial was on Monday, May 7, when the weather was clear and coal dry. In each case the water fed to the boilers was measured through the city water meter, and the dials recorded at 7 a. m., 13 m. and 6 p. m., and the coal was weighed to each furnace in every instance.

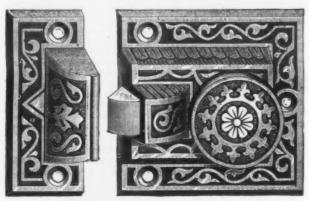
There appeared to be a doubt as to the quantity of water measured and used during the forenoon of the first day, as it seemed impossible that so much water could be evaporated by this lindirect firing, it being equal in volume to the average evaporation with di-The value of the quantity consumed has rect firing, and showing an advantage varied from \$750,000 to \$1,000,000, but last year over the single grate of 37 1-10 per cent. was only \$670,000. This was in consequence of Rather than make a statement shadowed with the lessened consumption and the lower price, a doubt we decided to make another test with which has, since the first of the present year, the double grate, and did so on Monday, when, fallen lower than previously for a great as usual after the Sunday's rest, the furnaces [Continued on page 11.]



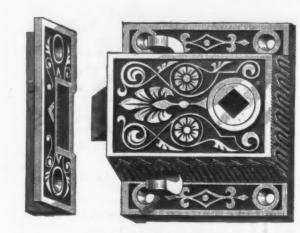
"Kahala" Bronze Square Cased Bolt, No. 8000-3 inch.



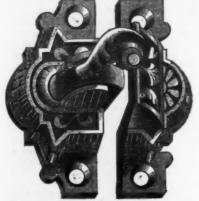
"Kahala" Bronze Barrel Bolt, No. 8000-4 inch.



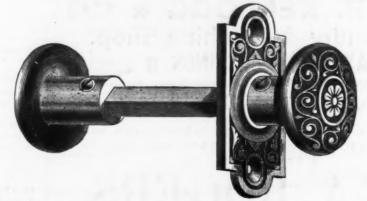
"Kahala" Bronze Cupboard Turn, No. 420.



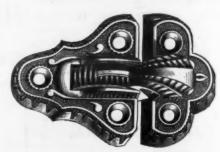
"Kahala" Bronze Cupboard Catch, No. 410.



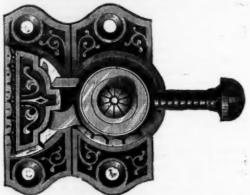
"Kahala" Bronze Cupboard Catch, No. 405.



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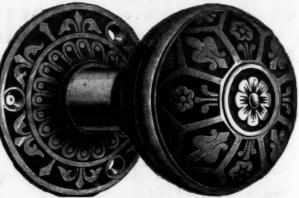
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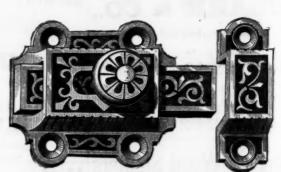
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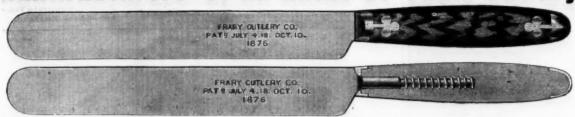
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[Continued from page 9,]

Comparative Experimental Tests With Steam Boilers Heated by Reverberatory Furnaces.

week, and consequently the percentage of gain was reduced to 33 63-100 in favor of the double grate furnace, but the result verified the record of the previous measurement of water.

New boilers in new setting, with clean heating surfaces, with good draught and careful firing on grates directly under the boilers, often exed for a time the good results as made by one of these 10 year old boilers in old setting. It is only fair to suppose much larger evaporation would have been made in both instances, had the boilers and flues been clean and in new setting.

It was particularly noticeable that little, any, black smoke was discharged from the stack connected with the double grate furnace, while heavy volumes were discharged from the other whenever a firing was put on or the coal

22 feet 18 feet 37.1	10.85 7.92 160° 160° 10 years 10 years	N. 42 B. N. 10 hours 5 to 60 hs. 45 to 60 hs. 45 to 60 hs. 45 to 60 hs. 45 ho hs. 45	nace. nace. May 3.
22 feet 33.63	10.66 160°	46° E. 10 hours 46° A. 10 hours 40° Ibs. 40° Ibs. 8,680 Ibs. 18-23 10 per cent. 2,412 14-7 23,762 8-86 9-85 9-85 9-85	Grate Fur- nace. May 7.

ciency of boiler is secured by using the double grate furnace, as compared with any style of single grate setting with which I am acquainted.

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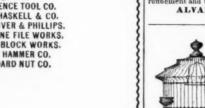
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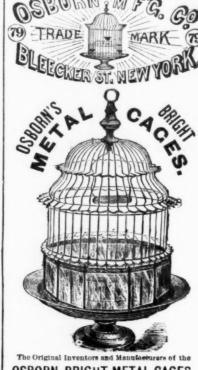


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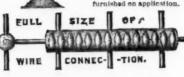
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The American Hardware Company are our agents for Australia. They will exhibit files of The Iron Age in the American Building of the International Exhibition, at Sidney, N. S. W., where exbectiptions will be received. After the close of the Exhibition, the files may be examined at, and orders for subscription directed to, their office in Melbourne. Sample copies will be mailed by them, free of charge, to any firm encaged in the trades we represent in Australia, Tasmania and New Zealand.

City subscribers will confer a favor upon the Publisher by reporting at this office any delinquency on he part of carriers in delivering The Iron Age; also, the loss of any papers for which the carriers are responsible. Our carriers are instructed to cellver papers only to persons authorized to receive them, and not to throw them in hall ways or upon stairs; and it is our desire and intention to enforce this rule in every instance.

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The Cost of War.

It is startling at times to think how in different the nations are to the consequences of that most terrible of calamities war. To those who are not immediate sufferers by its ravages, war is scarcely more than a drama of absorbing interest, and it is not until we begin to examine its statistics that we realize how terrible is the arbitration of the sword. Just now we are watching the preparations for a clash of great armies in the East, hoping that the crescent will go down before the cross, which, in this case, typifies the higher civilization, and wondering whether other powers will be drawn into the whirlpool of fire and blood and the war become genabroad would just now result in large pestimulation of our export trade, it is not hopeful that the worst may come and the competitors in the world's markets may be compelled to surrender their trade to us. This feeling is not general, of course, but it-is unquestionably true that, as a nation, we are comparatively indifferent to the happenings of the near future in Europe and Asia. This is not to be wondered at. perhaps, since we do not yet appreciate the terrible cost of our own great civil war, nor realize as a people the fullness of the measure of misfortune it entailed upon us.

That anything so barbarous as war should have survived the progress of nations toward higher standards of civilization, is certainly difficult to understand It would seem as if experience should have taught that war is like a two-edged sword without a hilt, cutting both ways and wounding the hand that wields it. But it lesson. The most superficial student of history will be struck with the fact that it is, at most, but little more than a record of bloodshed and destruction. Perhaps all this was necessary to the world's progress and the spread of the arts and sciences, to the organization of Europe and the crushing out of obstacles in the way of the onward march of civilization. We can understand now the benefits of the Roman conquests, and can appreciate the enormous and permanent benefits to the future resulting from the wars by which Charlemagne suppressed the barbarous tribes of Central Europe and laid the broad foundations of the modern French nation. The same is true of most of the wars of the remote past of which we have historical records that are sufficiently complete to enable us to trace their causes and consequences; but it would seem as if there no longer existed any necessity for the settlement of differences between civilized nations by an appeal to the sword, as there certainly would be no opportunity for such an appeal if those who bear the burdens could be made to understand how terrible a thing war really is. That they do not can only be explained by the fact that men are now actuated by motives and impulses very similar in kind to those which actuated their ancestors centuries ago. Pride of nationality, usually mistaken for patriotism, makes men often willing to submit to taxation and brave death in a cause which has no other interest for them than a natural desire to sustain what they are pleased to term national honor. There is also something in "the pomp and circumstances First Page.—Lane & Bodley Co.'s Hydraulic "of glorious war" which hides its practical levators. Rolling Stock in Rus-ia. Chinese Cheap abor. Mr. Robert Crawshay on the Welsh Iron " of glorious war" which hides its practical Elevators. Rolling Stock in Rus-la. Camese Cheap Labor. Mr. Robert Crawshay on the Weish Iron Trade.

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Which lead to war and the objects to be attained by it, are matters to which the masses of the people seldom give much thought. If they did they would soon see that the instances in which war is necessary between civilized nations are wholly exceptional. That Russia has some warrant for making war upon the semi-barbar-

> a popular passion. The only reasonable basis for the hope

ous Turks, whose misrule has been a scan-

dal to the world, is true, and we do not

wonder that the Czar has the sympathies

of all Christian nations, nor that it has

thus far been impossible to secure the

assent of the people of Great Britain to a

policy looking to the support of Turkey.

In but few of the wars of modern times,

however, have the pretexts been sufficient

to justify them, but they have been, gener-

ally speaking, popular wars, and in no in-

stance we can now recall, except in the

case of the differences between Great Brit-

ain and the United States, happily settled

by arbitration, has the voice of the people

pronounced so strongly and promptly in

favor of peace that the "war spirit" found

no opportunity to take root and grow into

strength of a nation was simply a question of the number and intelligence of the men it could put into the field. The slaughter in these old hand-to-hand fights was terrible, but beyond this they involved no great drain upon a nation's resources. Now wars are short, sharp and decisive, and the loss of life seems to be in inverse ratio to the improvement in the implements for destroying it. But the cost has steadily and enormously increased, human labor and human life have become steadily more valuable, and it is not difficult to see that the tendency of events is in the direction of a general disarmament. It must in time be with national defenses as it was with devices for the protection of eral. Under the idea that a general war the person. Up to the time when firearms came into general use, the weight of cuniary advantage to us in the enormous armor was gradually increased until men could scarcely carry it. But with the emimprobable that a great many are even ployment of gunpowder and firearms, life was no safer with armor than without it, war become so widespread that our great and men went into battle without any at tempt to protect the person. Great systems of fortifications are no longer counted as adding much to the security of a country against invasion, since cities which cannot be taken can always be starved into surrender; great navies are no longer of material value, and the progress of torpedo warfare promises to render them as valueless in time of war as they are costly in time of peace; great armies are not only enormously costly, but they withdraw so many healthy men in the prime of physical vigor from the useful occupations, that no nation can now afford to have its productive industries so seriously crippled as they necessarily are by the maintenance of great bodies of men in unprofitable idleness. In a word, war is becoming so costly that nations will does not-at least, we do not learn the ultimately be found to disarm as the only means of averting bankruptcy. Then, and not until then, will the nations learn to hold their passions in restraint, and their rulers to place a judicious check upon their ambition.

Perhaps this desirable era of peace would come all the sooner if we could learn to regard the soldier simply as a policeman hired by the state to protect its citizens and their property, and not as a hero whose glorious profession makes him more honorable than other men. Police men and soldiers are both necessary evils. perhaps, but the honor belongs not to them but to the producer whose labor increases the enjoyments of life, and who builds up and accumulates that which the ruthless soldier throws down and destroys Such men as Palissy, Jacquard, Newcomen, Arkwright, Stephenson, Brunell, Goodyear, Whitney, Fulton, Morse, Howe, and a score of others eminent in the arts of peace, were greater heroes, moral and physical, and triumphed over greater difficulties than ever did an equal number of the soldiers whose names have passed into history. We have given the soldier too much honor and the mechanic too little. and when we learn to rate each at his true value we shall have fewer men in the world ambitious of military glory.

Cotton Ties.

The paragraph published in our issue of March 22, regarding the "report that the entire contract for cotton ties for the present year has gone to England," has been the text for a large number of ar ticles, both at home and abroad. The Ironmonger, commenting on this, says:

as an authority on matters relative to the Ameri can iron trade, but few doubts were entertained as to its authenticity. After such incessant talk about the utter hopelessness of British frou firms again competing successfully with their rivals in the States, the news could but be welrivais in the States, the news could but be we-come, and naturally enough the most was made of it. There was a certain amount of truth in the statement, and that is all that can be said. Instead of the contract amounting to 24,000 tons, a sixth of that quantity constituted the order which it tures out was distributed order, which, it turns out, was distributed among four houses—the Chillington Iron Company, of Wolverbampton; the Wheelock Company, near Runcorn; the Pelsall Company, and Messrs. Maybury & Co., of Manchester.

In the first place, The Iron Age did not state that orders for 24,000 tons had been placed, but that it was reported that the entire contract for the year had gone to England, and that the order was on an average 24,000 tons a year. We were aware at the time the article was written that there was a large amount left over from last year's contracts, and that the absolute order was for only 4000 tons, but should the cotton business demand more than this it would be forthcoming at the

same price. The whole significance of this order is simply that these English firms were determined to have this order at any cost,

iron there was a heavy battle to be fought. The Engineer correctly represents our position when it says: "Meanwhile American journals, commenting upon these facts, state that in the higher classes of irons the closing battle has not yet been fought, and that as soon as there is an improvement in the American trade there will be a fierce struggle.

There is another feature in this order for cotton ties that should not be forgotten. A portion of the stockholders of the American Cotton Tie Company are English, and it is but natural they should wish that a share of the annual order should go to England. There will doubtless be one result of this order that will be anything but pleasant to the Cotton Tie Company, and that will be the placing of other ties on the market. Though the ties cost but \$2.50 they will not be sold at that price, and steps are being taken to manufacture other ties. As will be seen in another portion of this week's paper, a cotton tie company has been formed at Youngstown, with Mr. Cartwright, of Cartwright, McCurdy & Co., at its head, and we know of others we are not at liberty to mention.

Our Trade with other Cisatlantic Countries.

In previous articles we have traced the development of our trade with transat lantic markets, and pointed out the opportunities for still further extending our exports of manufactures. In this we shall show the growth of our trade with other American markets since the war, as compared with that of our trade with transatlantic markets.

General Trade Movement between the United States and other Countries, in Millions of Dollars.

(and of	her Countries, in Millions of Doll	ars.
Total	Other countries	British North American Possessions, Guiana British W Indies, Guiana French Possessions in America. Spanish, ditto. Duch, ditto. Dunsh W Indies. Mexico. Hayti and St. Domingo. Colombia. Brazil, Argentine Republic, Uracupy and Venezuela. Peru and Calii.	Fiscal Years
070.0	458.5	48 5-7-12-108 to 5	1864.
1 0.909	9.878.5	62 11 22 22 22 23 24 24 25 25 25 25 25 25 25 25 25 25 25 25 25	1805.
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1.132	291 841	# # # # # # # # # # # # # # # # # # #	1871.
1.212	804 908	# 48aaaaa # # # # # # # # # # # # # # # # #	1872.
1.841	1.006	98. 1188222881188	1873.
1.818	900	77 1474 1988 15 85	1874.
1.219	918 906	78 13 8 4 13 19 8 8 3 13 13	1875.
1.148	294 849	8 5 www.co.co	1876.
18-240-0	9-708-0 9-708-0	914 1-188 28-5-3 28-5-3 1-28-5-3 28-5	Total.
0.610 1	271.5	-15 Boassesses 5 0	Av'age.

The foregoing table shows great steadiness of exchanges with our Northern neighbors of British America. A remarkable progress is observable in our dealings with the Spanish colonies, notwithstanding the political troubles in Cuba. Our trade with Mexico has fluctuated widely. A state of anarchy there in any one year, it will be seen, reduces our trade to half its usual culations are not trusted as in iron. A average. With Brazil and the Southern republics our relations have steadily increased.

In the order of importance the inter-American business done by us during the thirteen years under review, has been distributed as follows.

With	Spanish	America	and	Brazi	Million Dollars.	Average,
64	British	95			1.118	86
44	French	61			31	2.5
66	Danish	5.0			28.2	2
64	Dutch	84			26.5	2
					9 539	971-5

It will be noticed that our Spanish American and Brazilian trade constituted tween the practice and theory would not 67 per cent. of our inter-American exchanges.

Glancing at the entire trade during the thirteen years, it will be seen that our the proportions were obtained by the eye relations with other American countries and no calculations whatever were made. have expanded normally and no more, while with the Eastern Hemisphere it has increased in a surprising ratio. The genof general peace is found in the fact that and further, that the fight for the control of eral inter-American average, indeed, but great that the judgment, unaided by mathewars and war preparations are becoming American iron markets between the Eng. little exceeds the year 1865, while it has matics, can no longer grasp them. It is so costly that no nation will be able to lish and American manufacturer is not doubled in the opposite direction. This is comparatively easy to guess at the size of a stand so heavy a drain upon its productive over by any means. We have again and due to the importance which our cotton, short rod which shall support a ton, but

resource. In ancient times the military again asserted that in the finer grades of grain, provision and petroleum export to Europe has attained. While our general import has of late years been considerably reduced, our export of domestic articles (principally those above-named) has gradually doubled, and Europe gets the bulk. t into the United States

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If, instead of expanding so much Eastward, our trade had increased more in this hemisphere, we should have been better off, inasmuch as we can do the American business in our own ships, while in the European trade the bulk of the freight is pocketed by Europeans. Within the next ten years we shall, in all likelihood, have the satisfaction of seeing our commerce develop largely in both directions. Revolutions in Spanish America are fast drawing to a close for the present, so far as appearances go, while Europe takes more produce from us than ever, as long as the Eastern war involves one grain-producing country after another, and even Egypt with its 400,000 bales of cotton.

Engineering and Construction.

The failure of the bridge at Ashtabula, the fall of the court house at Rockford. Ill., and the disaster in the New York Post Office, have furnished texts for numerous sermons upon dishonesty of construction, ignorance, carelessness, &c. There is no doubt that dishonesty, carelessness and ignorance enter as factors into a great number of accidents. The same is true of the grasping and relentless cupidity which stops at nothing in its efforts for gain; but the reasons are not always to be found in the easy way in which they are commonly sought by newspaper writers and the public. In no one of the three accidents we have mentioned do we think that the blame can be attributed solely to ignorance, carelessness or dishonesty. The true cause seems to have been a misapprehension in the minds of the builders of the conditions of safety in large structures, and inability to realize the importance of details which in smaller ones would have been matters of secondary consequence. We often find experienced men thus misled in designing works of unusual size, and the consequences are often, if not commonly, disastrous.

Even among our best engineers there are comparatively few who realize how much they depend upon judgment in designing such structures as bridges, where the use of mathematics has a more extended application than in any other department of mechanics. In common structures, like culverts, foot ways, boats, small buildings, tools, wagons and small machines generally, the judgment of an expert is often as good as the most elaborate calculation, for the reason that the calculation is simply a basis for reasoning and judgment, and in this case the reasoning powers are able to grasp the whole problem, all the data being easily comprehended. By continual exercise in this way men acquire very great skill in proportioning, and, if their practice gradually requires larger and larger constructions, they at last gain large experience, and become sufficiently skilled in the use of materials to undertake works of a magnitude, which the engineer accustomed to the use of mathematics would hardly dare to approach without a considerable amount of previous calculation. In timber structures the engineer is compelled to rely very largely upon his judgment, since the material varies so much in weight and strength that rules and calskilled man may design and construct a wooden vessel of perhaps a hundred or a hundred and fifty tons burden, without making any calculations whatever, and have her safe and strong. He may build both saw and grist mills and never put pencil to paper to estimate a strain or calculate the strength of a member, and yet may build very good and successful mills. Dwellings and stores are perhaps oftener constructed without calculation than with, and in the majority of cases, if the strains were calculated and the materials proportioned to meet them, the difference bebe great enough to be worth notice. So, too, we have seen steam engines constructed and successfully worked where But when a vessel of four or five thousand tons is to be constructed, the members are so large and the strains to be resisted so

when the problem is to support three or four hundred tons at the center of a complex girder, to which a long ship may be compared, it is simply impossible to comprehend the conditions without calculation. In bridge building the questions are complicated by the weight of the should be apparent to every one that, in etc., about buildings are much better con structure, and beyond a certain point we are unable to gain strength by adding material. The strains begin to increase so rapidly that our structure loads and finally tion of men and plans by the principle of destroys itself. In stores and warehouses of unusual size we again meet conditions apparently simple enough, but yet too great to be comprehended without mathe- competent engineer cannot afford to commatical assistance. Now, the iron or wood worker who has been all his life spent no time in fitting himself for his building ships, bridges, stores, steamers, or other things of a like character on in the end than those of the merely praca small scale, finding that they perform their functions successfully, and gratuitously. having an ambition for larger work, very often fails to see that he has not the ability or the scientific knowledge to undertake anything larger. His tugboat engines are handy, durable and cheap, and he sees no reason why he cannot undertake the con- tive Works, Philadelphia, died at his struction of an engine with a hundred inch cylinder and 12 feet stroke. But in 19th inst. Born in Ireland in 1817, he came the larger machine questions arise of which he may be wholly ignorant, and in the end he became an apprentice in the locomotive he may find that, familiar as he is with the behavior of rods a few inches in diameter, mained connected with that establishment the same metal presents strange features when he attempts its use in large masses, and the valve motion which worked well enough on a 16x20 cylinder is a frightful ceiving \$1,600,000 for his one-third interest steam waster upon the monster engine. Probably the designer of the Rockford an interest in the business by purchase in court house was perfectly satisfied in his own mind that he had properly proportioned the walls which were to support the dome, and that they were ample for the weight. It is very likely that he had no real conception of the weight which he was actually placing upon his masonry. In the case of the New York Post Office, those upon whom the responsibility rested do not seem to have grasped the idea of the weights to be supported nor the resisting powers of the metal employed. An example of this reckless indifference to the teachings of experience came to our notice not long ago. An iron bridge fell under peculiarly distressing circumstances, and the disaster was attended with considerable loss of life. An engineer who had examined the ruin, measured some of the more important members and calculated their strength, remarked in conversation with the bewildered contractor that the bridge ought to have failed. "How do you know?" asked the builder. "Because," replied the engineer, "it wasn't strong enough," and he handed the builder the paper on which he had calculated the strength of the members in its relation to the strains upon them. The builder looked at it in a puzzled sort of way and remarked that he would be much obliged if our friend would step into his office and show his bookkeeper how to make that calculation. He didn't believe his bookkeeper knew how, and it might come handy some time to be able to do it. Those who have designed bridges or

tioned, and which have failed, are often to him without a generous response. completely at a loss to understand the cause, and will commit the same errors over again and risk their own lives in so doing, thus giving the strongest proof of their own confidence. Nor can they always be charged with ignorance. We have seen many men who were able to make any calculation necessary, either in bridge or shipbuilding, yet who lacked that sound sense and judgment and that almost intuitive perception of the capabilities of a material, which seems to be one of the essentials in a man who is to design and carry forward great mechanical or engi-We do not suppose that anyone in the profession is so heartlessly corrupt as to build for profit, and with a full knowledge of its insufficiency, such a work as the Worcester dam proved to be. Probably the conger to life and property which would revery much whether by any process of illustrated. It is interesting throughout. reasoning or mathematical demonstration these same men could have been made to understand just how bad their work was, or that the fault was with them. In these days of great undertakings of all kinds, it must be impressed. not only upon men who have an interest

of all calculation, that 9 inch I-beams or the dry condition of the earth around and be-20-inch balks of timber are abundantly strong to carry any load, and who will always be unable to understand that materials in great masses cannot be treated in the same way as wires and rods. It roofs, rain and gas pipes, iron fronts, stacks, the execution of the great works which our ductors of lightning discharges than the light modern civilization renders necessary, we ning rods with polished points, etc., as here should not be entirely guided in our selecthe lowest bidder, nor look at the difference in price as merely the "measure of the relative greed of contractors." The pete in first cost with the man who has work, but his services are always cheaper tical man would be were they rendered

Matthew Baird.

Matthew Baird, Esq., for several years senior member of the firm of M. Baird & Co., proprietors of the Baldwin Locomoresidence in that city on Saturday, the to this country in his childhood. In 1834 yearly numbers continue to be called for, and works of Matthew W. Baldwin, and reuntil April, 1873, when, having been the senior member of the firm since the death of Mr. Baldwin in 1867, he retired, rein the concern. Mr. Baird first obtained careful compiler of statistics, and avoids the 1854. For some time subsequent he was engaged in a series of experiments for making a smoke consuming furnace for locomotives, which resulted in his invention of the fire brick deflector. His estate is estimated at about \$2,000,000.

Mr. Baird was a representative of the large class of successful American mechanics who have won distinction and fortune by honest and intelligent application, combined with the exercise of those natural gifts and mechanical abilities which are possessed by so many Americans that they have come to be regarded as national characteristics. The firm of which Mr Baird was a member has a world-wide rep utation, not only for its magnitude and enterprise, but for the excellence and durability of its work. It was one of the earliest locomotive works in the country and in the world, and its success has been largely due to the energy, skill, and honesty of the man who for many years was its head. Matthew Baird's death will be felt throughout a much wider circle than that embraced by his business and family relations and the corporate bodies of which he was an influential member. He was a very liberal man in all charitable and benevolent works-in the bestowal of

private individual benefactions as well as in generous gifts to those of a broader and more public character. In these his loss will be sensibly felt, for it rarely or never happened that an appeal from distress or suffering, or for money for a benevolent institution, or for a movement to promote other structures of the kind we have men- the advantage of Philadelphia, was made

New Publications.

The following new publications have been added to our stock of tooks during the week. Prices will be noted in our department of book advertisements:

NEW LANDS WITHIN THE ARCTIC CIRCLE: Narrative of the discoveries of the Austrian ship Tegetthoff in the years 1872-1874, by Julius Payer, one of the commanders of the expedition. With maps and numerous illustrations from drawings by the author. by the author.

This is a work of great interest and a valuable contribution to the literature of Polar exploration. The story is told modestly, simply and intelligently, and the writer manifests no neering works. Such men cannot be disposition to glorify himself or withhold from trusted with works of magnitude which his comrades the credit due them for their involve in any way the safety of human heroic efforts to battle the dangers of the life; nor, in fact, with any large work. frozen zone. The expedition was in part unsuccessful, as the Tegetthoff was caught in the ice off Nova Zembla and never got out, but was finally abandoned. The sufferings and hardships of the voyagers were terrible. management of the expedition seems to have been good, however, and Lieut. Payer is entistructors of this dam had no conception of tied to great credit for having brought his the real weakness of their work, or the dan- party through the perilous sledge journey which took them back to civilization. The sult from it. At the same time, we doubt work is one of great beauty, and is admirably

A PRACTICAL TREATISE ON LIGHTNING PROTECTORS. By Henry W. Spang.

Mr. Spang has given us a practical treatise on lightning protectors, which is a seasonable contribution to technical literature, and will do much to correct many wrong impressions which exist in the popular mind. It gives the principal known facts in reference to the elecin great works, but upon the people in tricity of the atmosphere and earth, and the general, that the common mechanic and lightning discharges which take place between the uneducated engineer, although capable them; and demonstrates that the electricity of of going through the forms of doing a the earth is principally accumulated in the great work, is not a proper person to be subterranean water bed. It shows that but few Thursday, the 24th of May next, at 3 p. m. pretrusted with it. Probably so long as the of the lightning rods or conductors now

neath their lower termini. It gives plain and explicit directions for the proper protection of buildings of every description, ships, oil tunity of being worthily represented there. tanks, steam botlers, wooden bridges, telegraph poles, etc., and proves that the metal tofore employed, and if properly connected with the earth, will effect absolute protection It shows a simple and reliable method by which the rain and waste water can be utilized to always maintain an easy path in the earth for lightning discharges, and thereby enable buildings and other structures to be properly protected. Mr. Spang is evidently a careful observer of natural phenomena, and practical in suggesting expedients which meet existing

THE COAL TRADE. A Compendium of Valuable Information Relating to Coal Production, Prices.

Transportation, &c. By Frederick E. Saward. Saward's "Coal Trade" is an annual with which our readers have already been made familiar by previous notices. It is a work of standard statistical value for all who are connected with, or interested in, the coal trade. The facts are presented in a concise and intelligible form. It will commend itself at once to the practical business man. The previous the fact that it is quoted largely by the press, and also by statisticians, attests its value Everything that it is necessary to know regarding the qualities and extent of coal, as also the tonnage and coal fields of the United States and Europe, may be found therein, while the business at various cities of the Union is a most interesting feature. Mr. Saward is a error into which book makers are too apt to fall, of encumbering his pages with useless matter put in as "stuffing" to make the volume larger.

GATHERINGS FROM AN ARTIST'S PORTFOLIO.
James E. Freeman.

A very readable volume of sketches, of sights, scenes and experiences, by an artist in Italy. Mr. Freeman is a gentleman of more than average literary abilities, and has gathered much interesting material which is presented in most readable shape. It deals principally with the romance of Italian art and art life. have not lately seen a pleasanter companion voyage than this little volume.

PETITES CAUSERIES. By Acheller Moltcau.

A delightful primer of the French language, intended for the use of children. It is designed to teach the elements of French by an easy, progressive method, and without any attempt to inculcate the rules of grammar. As any intelligent child can learn to read and speak correctly without any knowledge of the rules of grammar, provided they have grammatical example set them for imitation, there is little eason to doubt that the study of the laws of a language will be more profitable after the language is understood than before.

AFTER MANY DAYS. A novel by Christian Reid. A pleasantly written romance of considerable ower. From a somewhat hasty scanning of its pages we should say it would repay perusal.

Two Women. A Poem by Constance Fenimore A very interesting story, well told in verse.

ILLUSTRATED PRICE LIST OF W. C. DUYCKINCK, importer, manufacturer and dealer in supplies for railroads, steamships, machinests, mills, mines, etc., 50 and 52 John street, New York.

This price list and catalogue is got up for the purpose of giving those engaged in the branches of business named a complete list of everything pertaining to machinists' and other supplies of all kinds. The work contains 192 pages, profusely illustrated, and in looking it over it seems that nothing has been omitted that could by any possibility be illustrated. The value of the works of this kind depends very much upon the index, because in such a multitude of articles it is almost impossible to find what is wanted. We are glad to say that this particular catalogue is indexed most com-

Berthelot finds that the temperature of comoustion of carbonic oxide by oxygen, under constant volume, is comprised between 4000° and 2000°; by air, between 2200° and 1750°. Although his experiments furnish no certain evidence relative to the degree, the nature, or even the existence of dissociation, they seem to establish the possibility of producing real temperatures in the neighborhood of 3000'.

American Representation at the Paris Exposition.

NEW YORK, May 22, 1877.

GENTLEMEN: France was one of the first European nations to respond to our invitation, and her contribution to our Centennial Exhibition was not only creditable but brilltant. As a matter of national policy and courtesy, the United States ought promptly to reciprocate and people. It may be too late if Congress only takes necessary measures after its meeting in October; but it will not be too late for that body to ratify any wise and efficient steps which may have been taken by us, merchants, manufacturers, &c., in the interim.

For this reason we beg to request your presence at the meeting which will take place on cisely, in Room No. 24 of the Cooper Institute,

best interests in the matter. The United States have too much to gain at the great Interna-

We remain, yours, respectfully, JOSEPH SELIGMAN, C. F. CHANDLER, NATHAN APPLETON. JACKSON SCHULTZ, FREDERICK COUDERT, LEONARD BECKWITH. THOMAS BARBOUR. The members of the Committee.

Managing Committee: E. STERNHEIM and L. C. DE MONTAINVILLE, ROOM No. 24, Cooper Institute.

Scientific and Technical Notes.

In his address lately delivered before the Iron and Steel Institute of Great Britain, Dr. Siemens, as already announced in these columns, offered some interesting suggestions on the

UTILIZATION OF WATER-POWER BY MEANS OF

DYNAMO ELECTRIC ENGINES. We quote as follows:"The amount of water passing over the Falls of Niagara has been estimated at 100,000,000 of tons per hour, and its perpendicular descent may be taken at 150 feet, without counting the rapids, which represent a further fall of 150 feet, making a the force represented by the principal fall alone amounts to 16,800,000 horse-power, an amount necessitate an expenditure of not less than 266,000,000 tons of coal per annum, taking the consumption of coal at 4 lbs. per horse-power per hour. In other words, all the coal raised throughout the world would barely suffice to produce the amount of power that continually runs to waste at this one great fall. It would not be difficult, indeed, to realize a large proturbines and water-wheels erected on the shores of the deep river below the falls, supplying would be impossible to utilize the power on the spot, the district being devoid of mineral wealth, or other natural inducements for the establishment of factories. In order practically to render available the force of falling water at this and the thousands of other places under analogous conditions, we must devise a practicable means of carrying the power to a distance. Sir William Armstrong has taught us how to carry and utilize water-power at a distance, if conveyed through high pressure mains, and at Schaffhausen, Switzerland, as well as at some other places on the continent, it is conveyed by means of quick working steel ropes passing over large pulleys. By these means power may be carried to a distance of one or wo miles without difficulty. Time will probbably reveal to us effectual means of carrying power to great distances, but I cannot refrain from alluding to one which is, in my opinion, worthy of consideration, namely, the electrical conductor. Suppose water-power to be employed to give motion to a dynamo-electric machine, a very powerful electrical current is the result. This may be carried to a great distance, through a large metallic conductor, and there be made to impart motion to electro-magnetic engines to ignite the carbon points to electric lamps, or to effect the separation of metals from their combination. A copper rod of 3 inches in diameter would be capable of transmitting 1000 horse power a distance of, say, 30 miles, an amount sufficient to supply one-quarter of a million candle power, which would suffice to illuminate a moderately sized town. The use of electrical power has sometimes been suggested as a substitute for steampower, but it should be borne in mind that so long as the electric power depends upon a galvanic battery, it must be much more costly than steam-power, inasmuch as the combustible consumed in the battery is zinc, a substance necessarily much more expensive than coal; but this question assumes a total different aspect if, in the production of the electric current, a natural force is used which could not otherwise be rendered available."

Dr. C. Winkler, of Freiberg, makes some interesting observations on the

RESISTANCE OF ALUMINIUM TO ATMOSPHERIC INFLUENCES AND CHEMICAL ACTION.

um has always been regarded as a metal possessing but little resistance to exterior influence of change, and that it would readily be attacked by both acids and alkalies. The relative cost of zinc, aluminium and silver are as 1: 200 : 400 : or, considering the weights of the metals named, as 1 : 67 : 530. To test in practice the comparative wearing qualities of aluminfum, Herr Winkler has made a number of spoons respectively of silver, pure aluminium and German silver. A spoon of each material above named was accurately weighed on February 1, 1876, and all were put into daily use under precisely similar conditions for the period of one year. The color of all the metals altered in the lapse of time. The aluminium lost its luster and became a dead, bluish-gray color; the German silver also degenerated to a grayish-yellow tint; the silver lost only in color; its luster was not impaired. As regards mechanical abrasion, no marked difference was perceptible, although the cordial action of the French government after a year's use the aluminium spoon showed marked traces of wear at the edges. By accurately weighing the spoons at the end of the period named, Herr Winkler was enabled to establish the fact that the loss of weight suffered by the spoon of silver was 0.403 per cent.; by the aluminium spoon, 0.630 per cent.; and statement in the Comptes Rendus, is a magnifby the German silver, 1.006 per cent. From this fact it appears that the assertion that aluminium is unsuited to sustain wear is not borne tensity-according to the dimensions of the coil out. Upon the question of the adaptation of and strength of the primary current-from the world stands there will be men engaged in sage of heavy lightning discharges, owing to engineering works who will feel, in spite the small quantity of metal they contain and essary to be taken in the furtherance of our properties of the metal are concerned—and kaolin slowly wastes away, its surface in the

affirms that for small coins it is to be preferred to nickel or silver alloys

We learn from our London exchanges that the English government has decided to construct several

STEEL WAR VESSELS FOR THE BRITISH NAVY, the metal produced by the Siemens process having been found to answer the required conditions and to withstand the severe tests inposed by the Admiralty. The tests are to the effect that: "From every plate made a strip is to be cut, which, after being heated to a 'cherry. red ' color, shall be plunged into water having a temperature of 82° Fahrenbeit. After being thus cooled, the strip is to be bent, without fracture, until the radius of the inner curve quals not more than 11/2 times the thickness of the strip. This is known as the 'tempering test. Further, from each lot of fifty plates or angles, a piece is to be taken, and the edges having been planed para!lel, its tensile strength is to be proved. To be satisfactory, this must not exceed 30 tons, nor be less than 26 tons, on the square inch; and before fracture take place there must be an elongation of not less than 20 per cent. of its original length. " Under these rigorous, and, indeed, severe conditions, 101 samples of Siemens steel were tested, representing more than 5000 plates or angles, and gave, with few exceptions, the most satisfactory results. One of the most important of them is total of 300 feet between lake and lake. But that the steel after punching shows a very small reduction in strength. Summing up the advactages this steel has over previous manwhich, if it had to be produced by steam, would ufactures, Mr. Riley, the manager at Messrs. Siemens' works, says: "(a.) That it has nearly the same strength in both directions of the plate, and that is much greater than that of iron. (b.) That its ductility is equal to that of iron, and greatly superior to that of ordinary steel plates. (c.) That the resistance offered to impact, as shown in the percussion tests quoted, as well as in the specimens which have portion of the power so wasted, by means of been submitted to the bulging and gun cotton experiments, is superior to that of plates from either, say, good iron or ordinary steel. them from canals cut along the edges. But it That the tempering, and consequent diminution of strength produced by shearing or punching, is not as great as is the case with either iron or ordinary steel. (e.) That the surface of the plates being much smoother, the friction and consequent loss of power speed of vessels built of this steel must be less than in the case of fron vessels; and, (f.) That the superiority in strength of the plates made at London over iron, being so great, one of two results must happen in the case of vessels in whose construction these plates are used. Either they will be very greatly superior to iron vessels in strength. or their strength being reduced to that of iron, their weight must be equally reduced and the carrying capacity very largely increased." The value here claimed for this steel has not been considered exaggerated. It is sufficient to know that it is now being used in the construction of Her Majesty's ships, and that it will shortly, in all probability, be used more extensively. But it is more important to know that its use has introduced a revolution in naval construction, and that in the process Dr. Siemens has invented, a difficulty has been overcome which has baffled for years invention and experiment, while it opens a path for naval construction whose value we may foresee, but can hardly yet realize.

In connection with the foregoing it is inter-esting to know that the committee appointed by the British Board of Trade to consider the practicability of assigning a safe co-efficient for the use of

STEEL IN BAILWAY STRUCTURES,

have made a report in which they recommend that the employment of steel in engineering structures should be authorized by the Board of Trade under the following conditions, namely: 1. That the steel employed should be cast steel, or steel made by some process of fusion, subsequently rolled or hammered, and that it should be of a quality possessing considerable toughness and ductility, and that a certificate to the effect that the steel is of this description and quality should be forwarded to the Board of Trade by the engineer responsible for the structure. 2. That the greatest load which can be brought upon the bridge or structure, added to the weight of the superstructure, should not produce a greater strain in any part than 61/4 tons per square inch. They re nark that cases may arise when it will be proposed to use steel of special make and tenacity, and when a higher co-efficient than the above might be permissible, but they think those cases should be left for consideration by the Board of Trade when they arise.

Much attention is now being given to the improvement of

THE ELECTRIC LIGHT,

with a view to increase its economy and efficiency. The latest improvement reported to the French Academy of Sciences, about a month ago, provides for lights suited to ordinary use. The inventor transmits the powerful current from a magneto-electric machine through the primary believe of induction coils, the current in this case not, however, being continuous, but rapidly reversed in direction by the action of the machine itself. Every reversal of the primary current produces, of course, a spark between the terminals of the secondary or fine wire helices of all the induction coils in the circuit, and these sparks he utilizes in a new and ingenious way. He places between the terminals a piece of kaolin (the clay of which porcelain is made), in such a position that the thick, flaming spark produced by the coil plays over its surface. The result, according to the icent, luminous band, emitting a light as soft and steady as any that is known, and varying in intrack of the spark being worn off at the rate of about one millimeter (1-25 of an inch) per hour. If these reports are to be relied upon it is manifest that a great step has been made, and that illumination by electricity may soon become as common as gas-lighting.

AN 80 TON STEEL GUN. The great Prussian founder and gun maker, Herr Krupp, has just completed a monster steel gun, evidently designed to show that guns of cast steel can be produced on a scale to vie with the wrought iron ordnance of Woodwich and Elswick. The weight of the new Krupp gun is almost exactly that of the great Fraser gun, which has lately distinguished itself at Shocburyness. It thus falls short of the huge proportions of the 100 ton Armstrong guns which are being manufactured for the Italian navy. But a steel breech loading gun of 82,000 kilogrammes, or 80 English tons, 18, nevertheless, a production of a very marvelous and interesting character. The length of the gun, including the breech piece, is 29 feet 6 inches, the breech piece itself being 6 feet 4 inches in length. The caliber of the gun is 15% inches. The weight of the projectile will be 750 kilogrammes, or 1650 pounds, and the powder charge will be 396 pounds. The 81 ton gun of the Fraser construction has a bore of 24 feet, and an external length of 27 feet. As a 16 inch gun (without an enlarged powder chamber), it has taken a charge of 370 pounds of powder and a projectile of 1700 pounds. The external diameter of the Krupp gun, independently of a narrow strengthening ring at the extreme rear, is 5 feet 10 inches, that of the Fraser gun being 6 feet. The core of the Krupp gun is a steel tube in two lengths, upon which four steel rings overlap, rising in steps from a point between the muzzle and the trunnions, and accumulating in the thickness toward its rear. These more massive rings are irrespective of the narrow, strengthening ring over the powder chamber. The external diameter of the gun at the muzzle is 2 feet 31/4 inches. The weapon is provided with a pivoting carriage of wrought iron suitable for a coast fortress, weighing 45 tons. The price of the gun, exclusive of the carriage, is £20,000. Of course this includes a profit to the manufacturer, but the sum is more than double that which goes to defray the expense of producing an 80 ton gun at Woolwich Arsenal. There is, however, this fact to be remembered, that the great Woolwich guns are muzzle loaders, while the Krupp guns have all the claborate finish which appertains to breech loading ordnance. In common with the other large Krupp guns, the rifling of the new weapon is on the polygroove system, the clongated projectile being rotated by means of the gas check, a method which, there is little doubt, will be adopted in the British service, so as to dispense with the use of studs. The velocity anticipated from the projectile fired from the Krupp 80 ton gun is 473 meters per second at the muzzle, or 1552 feet, producing an energy of 27,543 foot tons, equal to 556 foot tous per inch of shot's circumference. The gun which we have thus described is by far the largest breach loader yet constructed. The nearest approach to it is the 56 ton breech loader shown by Herr Krupp at the Philadelphia Exhibition last year. This smaller, but yet formidable weapon, has been purchased by the Russian government, and is just now being delivered at Cronstadt. It has a caliber of 14 inches, and fires a charged steel shell of 510 kilogrammes, or 1122 pounds, with an initial velocity of 485 meters per second, or 1590 feet. The charge for the gun consists of 275 pounds of prismatic powder; but having now constructed the 80 ton gun, Herr Krupp is prepared to show that he can proceed still further in the production of steel breech loading orduance. The 80 ton gun has been constructed at Essen purely at the instance of Herr Krupp himself, though it is not likely that such a splendid weapon will long remain on his bands, despite its enormous cost. Should the demand arise, the great Prussian gun maker has a design already prepared for a gun of 124 tons, to be made on the same plan as the one we have just described, The larger weapon would have a caliber slightly exceeding 18 inches, and would throw a steel shell weighing 1000 kilogrammes, or a chilled iron shell of 1030 kilogrammes. The weight of the projectile would therefore be practically a ton, and the charge of powder would be probably about 500 pounds. The weight of the carriage would be 62 tons. The cost of the gun alone is reckoned at £33,500. Herr Krupp is at the present time supplying the Russian government with a number of 11 inch steel breech loaders, weighing 271/4 tons each. The weight of the carriage, with the pivoting arrangement (which weighs about a ton), is between 11 and 12 tons. Numerous or ders have also been received at Essen for field and mountain guns for service in Greece and Japan. Experiments are being made at Essen, or rather at the Meppen proof-ground, with the Krupp "shield gun," of which there are great expectations. A 6 meh gun on this principle is being mounted at Essen, and will be strictly tried. The "shield gun" is a device by which the muzzle of the gun is held within an aper ture in the casemate or turret, so as perfectly to close the aperture. The muzzle of the gun, necessarily a breech-loader, is fitted with a sort of globular collar, working in a corresponding cavity, after the manner of a ball and socket joint The gun is thus held, as it were, by the neck, and has no recoil. No rifle shot can enter the casemate, and the smoke of the gun is likewise excluded. Extraordinary precision of fire in the repetition of shots has been obtained by this arrangement, and the invention is thought likely to be of special value for the defense of fixed points. In connection with the fact that Russia has purchased the 56 ton Krupp gun shown at Philadelphia, it may be mentioned that the Sultan has obtained from Herr Krupp a duplicate gun for the defense of the Bosphorus. At the sixth annual meeting of the Monk-

AMERICAN SCREW

Manufacturers of

IMPROVED Gimlet Pointed Wood Screws, Patented

1876.

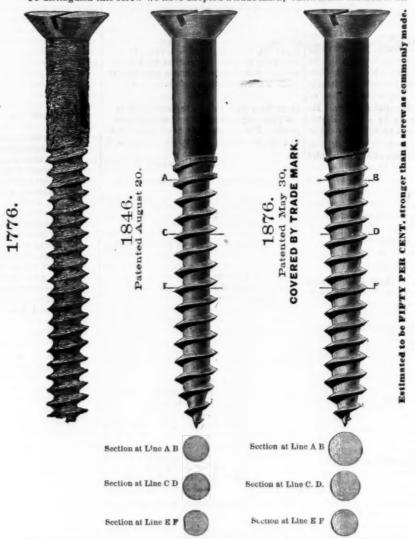


After forty years' experience we offer to the trade our Centennial Screw, patented May 30, 1876, as the best we have ever known.

The method of manufacturing is also patented, and we are changing our machinery as fast as possible, to manufacture the improved article only. To introduce them, they will be sold at same price as the old style screw.

The new sciews will be packed in manifa colored boxes with new label covering end of box, and enlarged figures showing plainly contents.

To distinguish this screw we have adopted a trade mark, which is also secured to us.



The above drawings show the progress of screw making from the old blunt point to style now adopted.

Experience has shown that the weak point of screws, as formerly made, is at the heel of the thread, where all the strains of forcing the screw into the wood naturally

To avoid the sharp angle existing in the old style of screws has been the aim of

all manufacturers, but every expedient hitherto adopted has proved as objectionable as the evil complained of.

It will be seen in our **new screw** that not only is the sharp angle avoided, but the strength very much increased, as illustrated above. See sections at lines.

CLAIM.

"A Pointed Wood Screw naving the outer periphery of the thread upon us body cylindrical, while a portion of the body below the thread and near the neck is conical, the remainder of the body to the point being cylindrical, and yet having all the thread brought to an edge of a constant angle, without jogs in the paths between the threads, substantially as described."

land Iron and Coal Co., lately held in Glasgow, some interesting facts respecting the practical working of

THE FERRIE SELF-COKING SYSTEM were presented. The chairman remarked that good deal has been said about the expense of econstructing their blast furnaces and adapting them to Mr. Ferrie's patent system. A good deal of doubt had also been expressed, on many occasions, as to whether the money of the shareholders had been well employed. Mr. Ferrie's estimate of the result of the conversion of six out of the nine furnaces owned by the company, was that the saving of coal on the make of pig iron for 1876 had been 46,800 tons, which, at 6/per ton, amounted to £14,-430, and the saving in dross amounted to £9750. The total amount due to the saving of fuel by the conversion of the six furnaces was thus £24,184, and over and above that in the malleable department; the fact that they now used no dross had enabled Mr. Ferrie, by an alteration in the puddling furnaces, to puddle with dross instead of with round coal, which represented upon the make something over £1500 a year.

The suggestion of Baron Von Leibig, touchng the production of

WATER GLASS FROM INFUSORIAL EARTH, was not brought into practical use, owing to the fact it was until recently impossible to obtain calcined earth. Since Messrs. Grune & Hagemann, of Unterluss, near Erschede, have succeeded in calcining and bringing the infusorial earth at small cost into the market, Capitaine has taken up this long since suggested method. He places caustic soda of a specific gravity, averaging from 1°23 to 1°24 in a digester supplied with a stirring apparatus, and adds thereto such a quantity of calcined infusorial earth that to every part of iodic hydrate 2.8 earth are present. Steam at a pressure of three atmospheres is admitted, and a perfect solution results in a few hours. The end of the operation is recognized by the clearing of the caustic solution and the deposition of a dark brick-red precipitate. A surplus of earth must be avoided, as the solution will not clear on other conditions. It is also to be observed that the solution should not obtain a greater specific gravity than 1.18. If caustic soda of 1.30 specific gravity be taken, the resulting water glass will have a specific gravity from 1.22 to 1.25, and will clear in less than a week. It is advisable to dilute to a specific gravity of 1.18. On account of the condensation of the steam, the water glass is always of smaller specific gravity than the caustic soda. Capitaine is of the opinion that water glass prepared by the wet way can compete ercially with the glass made by any other method in all such localities where the cost of transporting the infusorial earth does not exceed 15 or 20 per cent. of the original cost.

In a recent issue of Nature we find some in

teresting facts respecting TWO NEW METALS-ILMENIUM AND NEPTUNIUM, which may be summarized as follows: About 30 years ago R. Hermann announced the discovery of a new metal, ilmenium, accompany ing tantalum and niobium in various minerals, and closely allied to them in its general charaeters. Several years later he relinquisted his claims to the discovery, in consequence of researches by Marignac in the same field leading to entirely different results. Later investigations have, however, strengthened his belief in the existence of ilmenium, and in the February number of Kolbe's Journal fur praktische Chemic he not only brings forward results tending to establish the individual character of ilmenium, but describes a new metal, neptunium, belong ing to the same group, and occurring in tentalite from Haddam, Connecticut. As the quantities obtained are small, the characteristic reactions limited, and as the spectral properties cannot be made use of, chemists will naturally reserve their opinion till confirmatory observations have been made by some other well known investigator. The following are the essential results obtained by Hermann. The mineral was found to consist of equal portions of columbite $(ROMe_2O_3)$ and ferroilmenite $(RO2MeO_2)$. By fusion with potassium bisulphate the hydrates of the metallic oxides were separated out in

the following proportions:

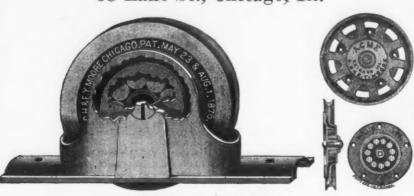
The hydrates can be changed into double fluorides, and from the greater solubility of potassium-neptunium fluoride, it may be obtained free from tantalum and ilmenium salts, but retaining a small quantity of the niobium salt; these, however, on being changed into niobate and neptunate of sodium may be separated on account of the greater solubility of the latter. By fusion of the peptunate of sodium with potassium bisulphate and treatment with water, the hydrate of neptunic acid was obtained in a pure condition. Neptunium may be distinguished from niobium and ilmenium by its having, along with tantalum, the property of forming an amorphous insoluble precipitate on the addition of caustic soda to the boiling solution of the fluoride; the other two form crystalline and easily soluble compounds. The very solu ble character of neptunium-potassium fluoride as compared with the corresponding tantalum salt serves to distinguish it from that metal. The reactions with phosphorus salts in the inner part of the bunsen flame are the following: Tantalic acid, colorless; niobic acid, blue; ilmenic acid, brown; neptunic acid, wine yellow. Addition of tincture of galls to solutions of the sodium salts gives characteristically colored precipitates. The atomic weight of neptunium, determined from the double salt 4KFl + Np2Fl7.2H2O, was found to be 118. Hermann has also obtained ilmenium in the form of a black powder by heating potassium-ilmenium fluoride with potassium chloride and potassium.

"CLIMAX" BARN DOOR HANGERS. "ACME" Barn Door Rollers.

Moore's Anti-Friction Sliding Door Sheaves.

S. H. & E. Y. MOORE,

68 Lake St., Chicago, Ill.



PRICE LIST.

"CLIMAX" No. 1, extra large and heavy, with long strap for heavy warehouse doors etc. "ACME," 6 inch wheel.

Packed 1 doz. pairs in a case.

MOORE'S ANTI-FRICTION SLIDING DOOR SHEAVE, 4 inch wheel per set, 4-00 Each set packed in a paper box. 1/2 doz. sets in a case.

Liberal discount to the trade.

For sale by the Hardware Trade generally.

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SPECIALTIES OF LIGHT IRON WORK.



CROWN WRINGERS,

CROWN FLUTING MACHINES,

with valuable improvements over other style Macaines, Patent Spring Arrangement and Clamping Device. Noted for Superiority of Finish and Practical Advantages. The leading Machine in the market.

Sizes (length of Rolls), 4½ inch, 5 inch and 8 inch.

Rolls with 10, 12, 15, 18, 22, 36 and 30 flates.

TOWER'S PATENT Double Shovel Plow.



Combines more good points than any other; adjustable handles; depth perfectly regulated from end of beam; adjustable foot; shares can be drawn down till worn out; a perfect BREAK PIN, by substituting wood plns for either at the foot bolts. Write for prices and discounts. Freight equalized to all important places.

J. & S. BONES & CO., Manufacturers, ROME, GA.

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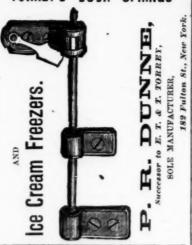
ELEVATORS For Hotels & Stores a specialty. Machinery in General made to order.

JAMES HENSHALL, Engineer, Machinist & Blacksmith.

1056 Beach St. PHILADELPHIA. Drawings made to order. Repairing of all kinds promptly attended to. Blacksmithing executed is all its branches.



TORREY'S DOOR SPRINGS"



A PORTABLE



For Every Family. Ap-proved and recommend-ed. Centennial Medal and Diploma, Send for For sale by the Hardware and House Furnishing

RUBBER MOLD WORK

OF ALL KINDS, Done at low figures by

The Blake Hose Co.,

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A NEW

Drawer Lock.

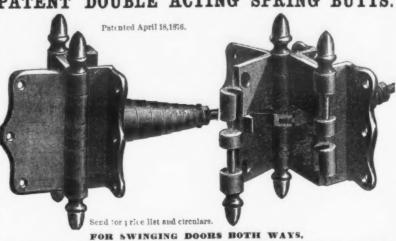
"STANDARD."

Applicable also to Cupboards, etc. Made wholly of Brass, and finely finished. Each Lock has two flat, steel, nickel-plated Keys. Dealers desiring to examine this Lock will re ceive a sample without charge, by addressing

The Yale Lock Mfg. Co. STAMFORD, CONN.

Subject to usual discount. PATENT DOUBLE ACTING SPRING BUTTS.

List Price, - . \$8.50 per dozen.



These Butts are the first ever constructed with two leaves only, and with flanges attached thereto to the door and casing, thus rendering them much more substantial and easy to put on, as the so yen from the outside. By means of the flanges the door is hung firmly to the casing, instead of to case with all other double acting Butts, and the screws do not become loose, as the strain on them is the back of the Butt is a powerful voice spring, and draws in direct line with the center of the digit the door firmly in position, and obetating all say. Our price list is from 25 to 40 per cent

GEER'S AIR CUSHION DOOR SPRING



TO MANUFACTURERS & DEALERS IN SKATES. CAUTION.

A re-issue of letters patent Aug. 18, 1874, No. 154,176, re-issued May 4, 1875, No. 6,410, re-issued Feb. 20, 1877, No. 7,524, application filed Nov. 14, 1876, having been granted to Oliver Edwards, all manufacturers and dealers are notified that they must cease making or selling any skates Infringing the same. Special attention is invited to claim 8, is a skate runner having its bottom constructed with a laterally projecting rib and its standards provided with plate supporting brackets, all made in a single piece of metal, substantially ing brackets, all made in a single piece of metal, substantially as and for the purpose described.''

Nearly every cheap, all-metal skate in the market infringes this claim. Manufactured only by the

FLORENCE MACHINE CO., Florence, Mass

The Inonmongen & Metal Anades' Advertisen.

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Phosphor-Bronze and Its Applications.

Mr. Alexander Dick, in a paper before the Society of Arts, gives the following information respecting phosphor-bronze:

According to antiquarian research bronze formed the earliest alloy produced. Some specimens are estimated to have an existence of from 4000 to 5000 years. It was not the alloy which we now call bronze, formed of copper and tin, but the result of the rough smelting of cupreous ores, and, of course, contained many impurities. It was used for casting do- smeltings becomes thick flowing and putty mestic tools, weapons and images; at a later period for bells, and still later for cannons. The difficulty of the bronze founder, during the later periods referred to, appeared to consist in the impossibility of obtaining pure copper and tin for his smelting, but even when these became articles of commerce, further chemists, but Dr. Kunzel was the first to emdifficulties were met with in producing sound ploy the same for the purposes above stated. A and reliable castings, and it is of but a recent date that some light has been thrown on the manufactured, varying in composition to suit nature and cause of these difficulties, as also on the objects for which they are intended. The the way how to avoid or remedy them.

In the year 1868 Messrs. Monteflore and Kunzel, of Liege, in Belgium, engaged in a series of bells, tools for gunpowder mills, &c.; other very exhaustive experiments with bronze and bronze castings. These gentlemen observed ing purposes, and the still softer for rolling, that the tin in bronze continually decreases by drawing and embossing, &c. oxidation during the process of smelting. They found that the oxide of tin partly goes into the slag and partly is dissolved in the street, London, with various phosphor-bronze

					Tin. Cop'r.
Bronze, or	iginally	composed	d of.		10.10 + 89.90
Contained	after th	e first sm	e!tin	g	9.82 + 90.18
66	4.6	second	8.6		9.40 + 90.60
84	6.6	third	6.6		9.16 + 90.84
64	4.6	fourth	6.0		8.52 + 91.48

The operators found great difficulty in deter mining analytically the proportions of the oxides, whether in combination with the tin or copper, or whether only mixed up in the metal. They found that "poling," a process by which the molten metal is stirred up with a wooden stick, will eliminate the oxide combined with copper, but has no influence on the oxide of tin; experiments by passing hydrogen over heated bronze filings proved equally ineffectual: the oxide combined with the copper was converted into water, and weighed as such, but the oxide of tin remained like in the "poling" process. It was in consequence of this difficulty that Dr. Kunzel, for the first time, introduced phosphorus into the molten bronze; this had the desired effect, and the metal, which at first had a dull and covered appearance, all of a sudden became bright and of metallic surface. Thus, by introducing a small proportion of phosphorous, or phosphuret of tin or copper, of previously ascertained composition, it was found that the total amount of oxygen contained in the molten metal eculd be ascertained analytically with perfect certainty. The absolute and elastic resistance of old bronze-that is, bronze containing oxidesis much smaller than that of bronze with new metal; and, as will be seen by the following experiment, "poling" will improve old bronze, while phosphorus greatly improves bronze "poled." Shavings of old bronze were melted and a bar thereof cast at 1595° C., the remaining liquid bronze was stirred with a wooden stick-" poled "-and a second bar cast at 1668" C. The then remaining metal was deoxidized with phosphorus and a bar cast at 1614° C. The three castings were thus made out of the same erucible and cast in the same manner in

	tesistance.	Lengthen-
Absolut lbs. per eq. Old bronze22,982		Per cent.
Old bronze poled.24,922 Old bronze de- oxidized with	17,709	\$-8
phosphorus33,916	19,300	6.8
There has the entire	walter alleri	matten of

oxide—the old bronze has tripled its tenacity and considerably augmented its absolute re sistance.

Having so far succeeded in eliminating th oxides from the bronze, the inventors showed that by the further addition of a small percentage of phosphorus to the bronze alloy the qualities of the latter became more and more changed, the grain or fracture became finer, the color brighter, the elasticity and resistance to strain and compression considerably increased, and when melted it attained great fluidity. Similarly, as minute quantities of carbon thus he said in a certain sense that what steel

alloyed with copper and tin. The manganese as also those of nickel and of iron. They obtained great tensile strength and hardness with qualities of the eastings uncertain and imprac-

rapidity. A minute addition of zinc to ordi- lowing results were arrived at: nary bronze augments the resistance to rupture by reducing involved oxides, but it softens the alloy and causes it to lose its elasticity. Phosphorus was therefore found to be the only ingredient which will improve bronze by giving reliable results. The action of phosphorus is twofold: (1) It eliminates the oxides as stated above, and (2) it makes the tin capable of adopting a crystalline structure, and, as two

ot crystalline, phosphor-bronze must necessarily be more homogeneous than ordinary increase the elasticity and absolute resistance of the alloy. Another great advantage of phosphor-bronze is that its hardness can be Without any exception, the results showed a regulated by varying the proportion of phosphorus, which in ordinary bronze is done by increasing the proportion of tin, whereby the danger of segregation in the casting is greatly augmented. Ordinary bronze after one or two like, while phosphor-bronze remains perfectly liquid until the moment it sets-solidifies; if, therefore, it is cast just before the "setting' takes places, no segregation is possible. Combinations of phosphorus with copper, with tin, or with other metals, have long been known by number of phosphor-bronze alloys are now scope of their application is, of course, very great. The harder alloys are used for casting somewhat softer alloys are used for engineer

The following tables will show the results of tests made by Mr. Kirkaldy, of Southwark

Besistance in

79 28 (

Cast metal.		recti fo	inch.	er e	quare
		Dimh of a be	Elastic		Ab- lute.
Pure copper Ordinary gun met	al, con-	Per et. 3.80	lbs, 4'4000		lbs. 975
taining mne parts one part tin Phosphor-bronze	*******	3·60 8·40 1·50 33·40	12.800 23.800 24.700 16.100	52	650 625 100 448
		g stress	Twists 5 in		exten-
Drawn metal.	Wire as drawn	ealed.	Wire	sosled.	imate sion.

lb*. lb*. 102 759 49 251 120 957 47 787 120 950 53 381 139 141 54 111 159 515 58 853

... 65-834 46-160 48-0 A series of interesting experiments with phosphor-bronze were made in Berlin by the Royal Academy of Industry, in order to ascertain the qualities and capacities of the metal while under heavy strain, and its resistance to often repeated strains. The first bar of phos phor-bronze was tried under a constant strain of 10 tons per square inch, and resisted 408,230 pulls; a bar of ordinary bronze broke even be fore the strain of 10 tons per square inch had been attained. A second bar of phosphorbronze was tried under a strain of 121/4 tons per square inch, and withstood 147,850 pulls, and a third bar, under 714 tons strain, broke only after 3,100,000 pulls. On the bending ma chine, phosphor-bronze, while under 9 tons strain per square inch, remained unbroken after 4,000,000 bends, while ordinary bronze broke after 150,000 bends. Major Majendie tested phosphor-bronze as to its liability to emit sparks when subject to friction, and attained very satisfactory results. The experiments were carried out at the Royal Gunpowder Works, at Waltham Abbey. A grindstone of 9 inches diameter was made to revolve very rapidly, so that any point on the grinding face would describe a distance of 2000 feet per minute; the metal was then pressed against the revolving stone, and the results proved that the harder descriptions of phosphor-bronz emit sparks less readily than the softer samples, and much less readily than ordinary gun

metal or copper. For frictional purposes the Phosphor-Bronz Company, in London, produces a special alloy, by fusing phosphor-bronze in certain proportions, together with another soft alloy of different degree of fusibility, so as to r alter the physical properties of iron and convert | cooling the given alloys. The shell is then the latter into steel, so a minute quantity of formed of a very tough and hard phosphorphosphorus changes those of bronze and con- bronze, and the interior of aforesaid soft allow. verts the same into phosphor-bronze. It may The bearing surface may then be considered to consist of a large number of small bearings of is to iron, phosphor-bronze is to ordinary soft metal, inclosed in castings of metal almost as hard as the arbor itself. The micro-Messrs. Monteflore and Kunzel next experiscope reveals this disposition very plainly, and the life of the wood is gone, making it possible mented with alloys of copper and nickel and if one of these bearings be carefully submitted that some of these structures may give way with manganese (binary alloys); also with (ter- to heat, so as to cause the soft fusible metal to nary) bronzes of copper, tin and manganese; run off, the rest will remain in the form of a with copper, tin and nickel, as well as with iron spongy mass. Bearings, slides, eccentrics, &c., of this peculiar alloy are now very largely in alloys they concluded to be entirely useless, use, and the practical results show that it wears more than five times as long as gun metal.

Phosphor bronze is readily rolled or beaten some of these compositions, but their ready out into sheets. In Russia it has been used as oxidability at high temperatures made the a material for cartridge sheathing, and speciout into sheets. In Russia it has been used as to properly turn the arch, and, at the same mens have stood 120 trials without tearing. Sheets of the alloy stand the action of sea Sodium eliminated the oxides contained in water much better than copper. In a comparathe molten bronze, but the slightest surplus of tive experiment made at Blankenbergh, lasting it produced an alloy which could not resist the over a period of six months, between the best atmospheric influences, and exidized with great | English copper and phosphor-bronze, the fol-

Thickness of the sheets 0.236 in.	Weight before immer- sion.	Weight after immer- sion.	Loss of	Weight.
Sheet of copper	lbs. 74.4 88.9	lbs. 73-2 86-2	lbs. 9:2 2:7	Per cent 3:018 3:100
Sheet of phos- phor bronze Sheet of phos-	69.5	68-75	0.75	1.143
phorus bronze	114.3	112-97	1.83	1:195

months' trial averaged for the English copper 3 058 per cent., while that of the phosphor factor of safety in all should be large. bronze. Homogeneity and absence of oxygen bronze was but 1 158 per cent., or about onethird. Several governments have experimented on the use of the alloy for making cannons. much greater resisting power over that possessed by ordinary bronze. The following instances of the results arrived at will be of general interest:

the second shot, with a charge of 1 k. 250 gr. (2% lbs.) of powder, and a cylindrical projectile weighing 8 k. 518 gr. (18% lbs.). The phosphorbrouze gun supported this charge perfectly; the normal charge was 500 gr. (1 1-10th lbs.) of powder, and 3 k. (6% lbs.) of projectile.

In France the ordinary bronze gun burst at (314 lbs.) of powder and 16 k. (3514 lbs.) of pro see that all structures are in complete condijectile, while the phosphor-bronze gun was fired five times with this charge, and burst at bolted together, so as to be continuous acros the second shot with 1 k. 750 gr. (3% lbs.) of powder, and a projectile of 20 kil. (44 lbs.), watch maintained of the rail that no bolts are

In Prussia it was shown in firing with the shots the exterior diameter of the chamber, that the phosphor-branze cannons only changed their dimensions when the thickness of the metal was below that of the dimensions of a cannon of the same caliber made of steel.

The Belgian government has adopted the phosphor-bronze for small arms and for the harness buckles of all their cavalry.

In conclusion, I beg to draw attention to the specimens of phosphor-bronze exhibited here: they are separated into different groups, each group is headed by an ingot of the phosphorbronze alloy used for the manufacture of the various articles belonging to that group.

Report of the Ohio State Inspector of Bridges.

The following is the report of Wm. S. Williams, C. E., Inspector of Bridges, made to Hon. L. G. Delano, Commissioner of Railroads, and dated at Cauton, O., Dec. 20, 1976, just nine days before the Ashtabula disaster:

The inspection made pursuant to your instructions of the bridges and other structures upon the railway lines in Ohio, and of the conto a portion of the lines operated, as, with the small amount appropriated to defray the expense, it was impossible to give a careful examination to all. A selection was, therefore, made of those lines having the oldest structures, or with inferior roadbeds. As the result of my examination, I submit the following comments and suggestions:

ROADS AND ROADBEDS.

The effects of the general stagnation of business are very plainly shown upon the railroads of the State in the disposition to economize in every department-a proper and praiseworthy effort, if not carried to such an extent as to affect the safety and efficiency of the road. There are, however, but few lines in the State that have their roadbed, ties, rail, bridges, and structures in such condition that they can afford to economize in the road department. A good roadbed is the important element of a successful road. It should be well thrown up, the side drains kept open, and the end of the ties should be free. The road must be well ballasted, so that the rail will be kept up to a smooth, even surface, otherwise the rall will soon be destroyed, the rolling stock rapidly deteriorate, the regular running of trains becom impeded and the smooth working arrangement of the road sooner or later become disarranged, and, in fact, unsafe for business to be done upon it. It will, therefore, be a true economy to place the roadbed in a good condition. WOOD BRIDGES AND TRESTLES,

On some of the roads these structures ar carefully looked after, and receive frequent inspection from the railway officials, while on others they are treated with absolute negligence. There is a disposition on some roads well managed and all other interests cared for, to make old, worn out structures last one year longer—a hazardous course, strongly to be reproduced and around a product. robated and avoided. There are also som light wood bridges in existence, built for engines of about one-half the weight of those that are now run over these structures. Many show no outward sign of decay, have perfect camber, and, to all appearances, are in as good condition as when first erected. Yet, upon careful examination, it will probably be found that suddenly, and with but little warning. The timbers of this class of bridges should be carefully and frequently examined by the railway

IRON BRIDGES

In cases where it is impracticable to build stone-arch bridges for want of sufficient hight time, secure a sufficient water-way, the next best structure is an iron bridge built upon some improved plan. Within a few years past, important improvements have been made in bridge building, in plans, in general details of con struction, and in mechanical skill and workmanship. There are now several differing plans, nearly all good, and a bridge built upon either, properly constructed in all its parts and of good material, will prove an excellent structure. There is more danger from improper or deficient workmanship in construction than from fault in the general plan. There should always be the proper amount of iron, in the proper form and proportion, and of the proper kind for the different members throughout ; taking for those in tention the tough, ductile, crystalline metals form a much more homo. The loss in weight, therefore, due to the ox- fibrous quality; for members undergoing com-

geneous alloy than two metals, of which one is idizing action of sea water during the six pression or shearing strains, that securing the stiffness requisite to resist deflection; and the bridge should be carefully adjusted in all its parts : parallel members in tension, having the same pin-couplings, must be of equal length to bear equal strains; and eye-bars of unequal lengths, not capable of being adjusted, should be rejected. A bridge should receive careful and frequent examination, that bolts, plus and nuts are in their proper places-not drawn up In Belgium the ordinary bronze gun burst at to such a tension that the bridge will be pulled to pieces, neither should they be so loose as to allow injurious vibration. The durability and safety of a bridge depends largely upon the care taken of it. If only one or two trains per day are passing over a bridge, it may last a long time with indifferent care, but where the number is largely increased, as upon some roads, the second shot, with a charge of 1 k. 500 gr. it would be not only prudent but economical to tion. The track-stringers should be securely wing to the wedging of this in the barrel. The out of the fish-plates. In case the roadway is normal charge was 0 kil. 550 gr. (1% lb.) not kept up to a high standard throughout, the powder and a bomb of 4 kil. (8 4-5 lbs.). track upon each approach, for at least the track upon each approach, for at least the length of a train, should be in such condition egulation charges, and diminishing at each 50 so that a train may steady up and pass over the bridge safely. There should be no change o grade at a bridge, nor, if it can be avoided should a bridge be placed upon a curve, and at engineer should be probibited from increasing or decreasing the speed of his train while upon any structure.

The several points noted being observed very little oscillation can take place, and trains will be able to pass over such structures year after year in perfect safety.

Vigorite .- A writer in the Marquette Mining Journal describes the manufacture of the new explosive, vigorite, as follows: On the shore of a besutiful lake between two large hills, and in as romantic a place as was ever mentioned in a five cent dime novel, inclosed by a board fence ten feet high, are four buildings, ware house, nitro-glycerine building, mill proper carpenter shop and magazine. The first is a one story building, 18 by 24 feet, in which are kept the ingredients of which the vigorite is made. From this building they are transferred to a three-story structure, 24 feet long by 10 feet wide. In the third story of this building is a large vat in which the powder is mixed dition of the roadways, was necessarily confined from this it runs into a barrel on the second floor and is washed, when it is conducted by means of a tube to a box in the mill building. This is a one story structure (joined to the glycerine building) 40 feet long and 10 feet wide. All our previous experience with powder had led us to expect a cold, dreary room, with a wash dish in one corner, and no stove within five hundred yards of the concern but as we entered this building all our fearful anticipations were dispelled. A large box stove stands in the center of the room, heating the building and making it comfortable for all con cerned. The mixture that comes from the wash room to the mill is not vigorite in a finished state. As the explosive is needed this mixture is placed in a large box and mixed with nitro-glycerine. It is then packed into cartridges made of paper, and coated with paraffine these cartridges may be of any length desired, but are all of the same diameter-1% inches When packed and ready for shipment the powder is transferred from the mill to the magazine, a small one-story building, 10x26, and from there is delivered. In planning and laying out the work, the superintendent, Mr. Ward, took the best possible advantage of the location and for general appearances, convenience, com fort, economy and all such things, it could not have been done better in any place in all Christendom. One feature of the powder manufactured by this concern is the comparative safety with which it can be banged around, without any danger of its knocking somebody higher'n a kite, and placed unconfined upon a piece of paper it will burn away without the least attempt at an explosion.

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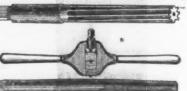
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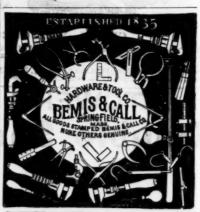
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Russian Cast Steel Guns and Gun Foundries.

Russia has for many years past been improving her arsenals, foundries and military workshops in a very quiet way, all the time taking care to preserve the utmost secrecy about them. The navy itself is better known than the army. but the dockyards, foundries and workshops, from whence it draws its material, are but little known. The great foundries at Oboukhoff. near St. Petersburg, which rival those of Krupp, at Essen, furnish the steel rifled guns used in the Russian navy. The foundries are in private hands, and have guarantee of their time being all filled by government work, occupy government buildings, are now under gov ernment supervision, and are virtually government works. They are named after Mr. Obouk hoff, a mining engineer in the government service, who invented in 1851 an improved process of casting steel in great masses. At this time the Russian ordnance department was entirely dependent upon Krupp for their heavy artillery, and were naturally anxious to establish a home manufacture. Mr. Obcukhoff's process was used, and he became superintendent of the works. Work was commenced in 1864. In 1866 Mr. Oboukkoff retired, and Captain Kolokotzoff, an officer of the imperial navy, was appointed general superintendent of the works. Colonel Mussellus, a naval artillery officer, was made technical superintendent, and the present successful career of the Oboukhoff foundries was commenced. The first gun from the foundry was sent for trial in 1864. It was a muzzle loader of 8 inch caliber, carrying a shell weighing 200 pounds, and using 30 pounds of charge. At 3600 yards an armor plate 41/2 inches in thickness was pierced. The gun burst on the 109th round.

This led the manufacturers to make various experiments in the manufacture and casting of the steel, which led to such favorable results that in the same year they turned out a 9 inch gun, burning 37 pounds of powder, which, after 614 rounds, showed no interior change. In 1865 the Krupp breach loading system was introduced at the Oboukhoff foundries. In 1867 the hooping system of General Gadolin, of the Russian army, was adopted to strengthen the guns. The foundries in time of peace employ some 1500 men. The cast iron used is from the blast furnaces of the Ural district, and is converted into steel by the "charcoal method."

Some 400 plumbago crucibles are used, each holding a charge of 92 pounds; they last for about five heats. About 120,000 of these crucibles are manufactured yearly in the works. Siemens' gas furnaces are used with peat for fuel, of which large deposits are found in the vicinity. Analysis of the materials, both for the crucibles and the steel, are very carefully made, and the results carefully noted. The castings are made in cast iron molds lined with sand. Two men carry each crucible to the side of the casting pit, where they are ranged in rows around it, and the work is so timed that a continuous stream of molten metal is poured into the mold. As many as 120 crucibles are used in the casting of a 12 inch gun, and it is an affair of only from 15 to 20 minutes. The steel used for the casting of the guns contains from one-half to three-quarter per cent. of carbon. Some 10 or 12 hours after the filling of the mold the core is taken out, and water let in to cool the casting. The stream of water is continued for several days until the gun is thor oughly cooled.

After a casting has been made a sample is taken from the muzzle, the breech and the center. These samples are subjected to physical and chemical tests, Kirkaidy's well known machine being used in the former case.

From this it will be seen that these guns bear a very close resemblance to the American cast iron guns, which are cast hollow, the essential difference it would seem being the substitution of cast steel for cast iron.

After the casting is finished the crude mass is holsted out of the pit and is taken to the smithery, where it is put in the Siemens heat ing furnaces, and then toughened by being lifted into an immense cylinder containing boiling linead oil. The two together are then gradually allowed to cool. This whole operament of its being taken out of the oil, is per-formed with great accuracy. The process of casting avoids all the troubles and dangers in-cident upon building a gun up from coils, and tion, from the heating of the gun to the me cident upon building a gun up from coils, and is vastly cheaper. The "cylindro-prismatic" wedge system of breech loading is employed,

with the Broadwell gas ring.
Not long ago Captair. Kolokotzoff invented a new process of relining the guns after they had stood 800 rounds. Formerly, after this limit of safety had been passed, the gun material was recast into various shapes, such as axles, shafts, wheels, &c. Captain Kolokot-20ff's idea was to bore out the interior anew after the safety limit had been passed, and to insert, under hydraulic pressure, an interior tube of one inch in thickness, and the gun is again rifled. According to this process a gun having been fired 800 times is relined, and is able to stand 500 rounds; being again relined, it is good for three hundred rounds more. This method has proved very successful, and is certainly very economical.

The foundries at Oboukhoff produce many sizes and classes of guns, from a four pound howitzer to a forty-one ton gun, baving a twelve inch bore, carrying a shot weighing 715 pounds, and using a charge of 130 pounds. The average production in guns for the last five years of peace has been some five thousand tons, at a cost of, in round numbers, say of \$1600 per ton in finished guns, a very low figure when compared with the cost of the more expensive of the large guns upon the Whitworth or Armstrong system. The works furnish guns for fortresses and the army

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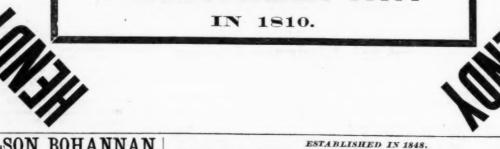
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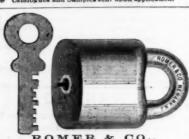
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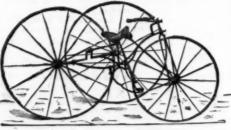
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as well as for the navy, and manufacture also some 40,000 gun barrels per annum. In time of peace a large amount of railway and other material is manufactured. Since their establishment these works have furnished some 400 guns of heavy caliber to the Russian Imperial The larger guns, ranging in weight from 15 to 41 tors, burn charges of from 52 to 130 pounds of Russian prismatic powder, and show velocities of from 1300 to 1400 feet per econd. The 41 ton gun-12 inch-gives its 715 pound projectile a vis viva of some 9200 foot tons; the 11 inch projectile, 550 pounds, has a force of 5600 foot tons, and the 9 inch, or 300 pounder, 3300 foot tons.

The large iron-clads, such as the Peter the Great, the Popoffkas, Novgorod and Vice Admiral Popoff, use the 12 and 11 inch guns. Some of the larger turreted frigates also use the 11 inch guns. The majority, however, of this class of ships and the monitors use the 9 inch guns. The seagoing frigates and cruisers, uch as the flagship Svetlana, now in our waers, use the 8 inch guns. The 6 inch Obouk-noff guns are used on board the corvettes and ippers of the Imperial navy, as well as on the coast defense gunboats. The new gunboats, built in sections and capable of being transported, about which much curlosity is felt and from which so much is expected, are said to easily steam eleven and one-half knots, and to give easy handling of their powerful 11 inch 30 ton guns. The 9 pound howitzers are used on the smaller vessels of the navy as a supplementary ordnance. They are also used on yachts and gunboats. The 4 pound howitzers are used on the bulwarks of large ships for defense against moving torpedoes. The only difference between these Oboukhoff guns sent to the navy and those made for the fortresses lies in the carriages. The so-called 4 pounders carry a 14 pound shell with a 1/4 pound bursting charge, so that they are quite formidable weapons for close work. The 9 pound howitzers carry 27 pound shells with 1 pound bursting charges.

The great government gun foundries at Perm, which furnish principally the artillery used in Russian fortresses and in the Russian army, are situated on the left bank of the river Kuma, about four versts from the city of Perm, the chief seat of the district and government of the same name. These works produce large steel guns up to as high as 11 inch bore, and guns and projectiles up to 20 inch diameter of another class, field artillery, musket barrels, projectiles, &c. The works were started by the imperial Russian government in 1864, and now have an annual production of war material of from 20 to 25 steel guns of various calibers, from 20 to 25 9 inch mortars, weighing from 280,000 to 350,000 pounds; from 10,000 to 15,000 musket barrels; guns of cast iron, weighing from 600,000 to 800,000 pounds, and of projectiles of hardened cast iron some 300,-000 pounds. The total annual production amounts in value to about \$1,400,000. The total number of workmen employed is some

The various steam engines employed have a capacity up to 2300 horse-power. There are 240 furnaces for the manufacture of cast steel which are heated with wood and 144 which use coke. There are 10 ovens of the system known as Sisching, and 1 of that known as Peruv; 5 puddling furnaces, 8 welding ovens, 7 for gaseous cast; 11 reverberatory furnaces, 2 American furnaces and about 100 smiths' hearths. The array of steam hammers is formidable. There are 1 with a capacity of 50 tons, 1 with 15 tons, 1 with 12 tons, 1 with 5 tons, 1 with 21/2 tons, 1 with 800 pounds, 1 with 80 pounds and finally 2 with 400 pounds. The cast iron used is received from the great blast furnaces in the mining district of Goroblagodat, whose great magnetic iron mountain Blagodat produces 40,000 net tons per year. Some puddled steel is received at the Perm Gun Works from the mining district of Zlatoust, 1u the Ural, but the major part is manufactured on the spot.

The following description of the manufacture and trials of a 20 inch Rodman cast iron gun will be found interesting: The gun is 216 inches long; outside diameter of the breech, 64 inches; weight of the gun, 45 tons; weight of projectile, a hollow spherical cast iron shot, 1250 pounds. On its trial this gun was fired 314 times, with charges of from 100 to 130 pounds (Russian) of prismatic powder. The ore had expanded at the conclusion of the Six gas furnaces were required to smelt the

trial 0.005 inches.

Six gas furnaces were required to smelt the amount of cast iron used in the casting of the gun. In each furnace 28,440 pounds were smelted. The smelting of the cast iron took between four and a half and four and three-quarter hours. The pouring of the molten cast iron into the casting form was made without any interruption, and in the short time of twenty-three minutes. The cast mass was allowed to cool ten hours before the core was taken out. This operation took about two hours. The water was then let into the bore, and a continuous stream passed through until the mass had cooled thoroughly, which took place after 161 hours. The casting mixture was composed of 16% per cent. of remelted cast iron, and 83½ per cent. of new bayonet cast iron, of the latter one-half was manufactured of magnetic ore from the Blagodat Mountain, one quarter was from a mixture of matunin and brown iron ore, and another quarter of brown iron ore alone.

Under physical tests five pieces of standard cut from a circle two inches in thickness which had been cut out of the cannon near its mouth, gave the following excellent results: Average tenacity, 35,800 pounds to the square inch in short pieces, and 29,200 in long pieces. The average of full compression produced by a weight or 50,000 pounds to the square inch was 0.00288; the average clasta stretch, 0.00187. The average of full compression produced by a weight or 50,000 pounds to the square inch was 0.00046; medium of constant compression under the same circumstances, 0.00425. The cast iron had a specific gravity of 7.271. The gun cost to manufacture, \$55050, or about \$2.15 per 40 pounds. The two foundries above described are the principal ones in Russia, though there are several smaller ones, both gevernmental and private—notably the AlexandrovskuWorks in the government of Olonetz.

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We have also for sale a War Map containing on

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Taken altogether the map is very complete. and will be wanted by every one who desires to keep posted in regard to a war which cannot fail to excite the greatest interest in the United States among all classes. Size, 23x37 inches. Prices, within rollers, \$1.00; sheet form, 50c. Sent postpaid on receipt of price.

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To whom it may concern:

No. 7534.-Improvement in Machines for "Shav ing the Heads of Wood Screws," dated Feb. 27. 1877 (original Patent, of watch this is a re-issue, dated Oct. 18, 1864).

No. 7573.—Improvement in Machines for "Threading Wood Screws," dated March 27, 1877 (original patent, of which this is a re-issue, dated May 17.

No. 7574.-Improvement in Machines for "Nic" ing the Heads of Screw Blanks," dated March 27, 1877 (original Patent, of which this is a re-is-ne,

dated May 17, 1864).

The above inventions relate to that class of Screw Machines in which the screw blanks are successsively inserted in receivers arranged radially upon a hub, which has an intermittent rotating motion,

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Any porties constructing or using machinery in volving the subjects of invention set forth in said three re-issued patents, will expose themselves to prosecution for infringement.

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Ha ing purchased an important interest in the Norwegian Plow Company, and my health having become somewhat impaired, I wish to give my entire attention to my manufacturing interests; there fore I will sell out my business in Dubuque, Iowa, consisting of the jobbing of Hardware Specialties, Agricultural Implements, Pumps and Seeds. Alzo, I have a large retail trade. The business is 22 years old. My stock is in fine condition, with very little unselable stuff. Trade is new in full tide, and my customers are to be found in most every vilage and town of importance in Northern Iowa, Southern Minnerota and a portion of Southwestern Wisconsin. The store is a large, new and very convenient building, th. tean be had for eight years at a low rent. No better opening for a business of this kind, or the jobbing of Hardware alone, is now likely to be found. Correspondence and a thorough examination of the business is invited.

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One No. 3 Pratt & Whitney Screw Machine; one 13 in.x4ft. and one 16 in.x5 ft. Pratt & Whitney Lathes with taper; Brown & Sharpe Milling Machine; Upright Drill; and a general assortment of Machinists' Tools.

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For Puddling, Boiling, Bushelling, or Reheating Iron. Its therough efficiency apparent on exa-tion, and two years' practical test pro-it will do all that is claimed for it. but little to first cost, or may be applied to old fur naces, and any furnaceman can work it withou special instruction.

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One Rolling Mill, with two trains of Rolls, two Engines, 24x36 and 12x24, and all tools and appara-tus for making iron; also the Ground (10 acres) on which it stands; also one 5 ton Steam Hammer also Pig, Scrap and Muck Par Iron

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tared and unmanufactured, in and about said premises.

Said property to be sold subject to all encumbrances, except the second trust deed, and free from that. Bids will also be received during same time for the interest of said bankrupt in the contracts for surmishing the iron for the new Cook County Court House, at Chicago, and the new Court House, at Chicago, and the new Court House, at Peoria, Illinois. Inventory and full description of the property and encumbrances, and the contracts and abstracts of title, may by had at the office of Kia & Parker.

Bids may be for the whole or any part of said property, or contracts, and will be opened between 9 and 10 °clock a. n. on said 8th day or June, 1877. In presence of the Judge of the District Court of the United States for the Northern District of Illinois, and accepted or rejected as the Court may direct.

Chicago, May 9th, 1877.

direct.
Chicago, May 9th, 1877.
CHARLES E. RAY, Assigner
ELA & PARKER, Attorneys for Assignee.

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A young man with considerable business experience, active, energetic and of good address, desires a position as sales agent for a line of from manufacture or other staple goods. Has excellent business habi s, and is a bird worker. Acquainted with all manner of office work, and would make bimself useful in that capacity when not otherwise employed. Good references. Address Office of The Iron Age, 220 S. 4th St., Philadelphia.

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I have three patents for Dies, Machinery and Tools for making Augers and Bits, each running seventeen years; dated as follows: Dec. 19, 1865; January 31, 1865, and July 3, 1866. There is a special claim on each of the dies. All persons infringing on said patents will be held responsible to the extent of the law. Russell Jennings.

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Palmer, La Grange & Duval, SHAWNEE, OHIO.

Furnace Builders & Mining Engineers, Will contract for the construction of Furnaces complete and in blast, or furnish drafts, specifications and give general instructions. Will pet in stoves and machinery of any description that may be required. Information for furnace locations can be obtained at our office in Shawnee, on application or by letter.

Jos. Palmer. H. La Grange. B. F. DUVAL.

DROP FORGINGS. The TRENTON VISE & Tool Works, Trenton, N. J., having increased their facilities, are now able to do all kinds of

Iron and Steel Drop Forgings n quantities to order at reasonable rates HERMANN BOKER & CO., Proprietors, 101 & 103 Duane St., N. Y.

WANTED.—A first-class business man familiar with machinery and manufacturing, capable of handling large bodies of men, desires a responsible position. References satisfactory. Address, IRON AND STEEL,

Care of P. O. Box 813, Bridgeport, Conn.

Wanted.

An engagement by a thorough and practical Engineer to superintend or construct Machinery, or would fill the position or Engineer and Janutor of public building. Has had over twenty years' experience, and can supply abundant reference as to ability and character. J. M. MILLER. Address

Office of The Iron Age, 83 Reads St., N. Y. Important to Manufacturers. BISSELL, WELLES & MILLET,

Auctioneers and Commission Merchants, No.

15 Murray St., New York,
Selicit from Manufacturers and others consignments of Hardware and Cutlery for our weekly
Auction Sales to the Trade, or at private sale for
cash, as desired. Our facilities for moving large lines
of goods are unsurpassed. Advances made if desired.

TO LET.

A Light, Handsome Office.

Possession Immediately. HERMANN BOKER & CO., 101 Dunne Street, N. Y.

Trade Report.

Office of The Iron Age. Wednesday Evening, May 23, 1877. The past week has been one of general dullness in Wall street. The money market has continued easy at 2 @ 3 per cent. on call. The discount rate on prime business paper is 31/4 @ 41/4 per cent. The gold market has been quite steady, and foreign exchange strong.

The following table shows the daily range of the gold premium:

Highest,	Lowest.
Thursday 107%	107
Friday 107	106%
Baturday	106%
Monday107	106%
Tuesday	106%
Wcdnesday107	106%

The bond market has been quiet and strong At the request of the Syndicate, which is nego tiating the 41/4 per cent. bonds, the Secretary of the Treasury has called \$10,000,000 more of 5-20s. Investment shares are strong and moderately active.

The stock market has been dull and heavy. As noted elsewhere, the coal companies have stop mining coal from the 15th of June to the 15th of July, the agreement on the part of the Reading having been conditional on the approval of Mr. Gowen, who is now in London, endeavoring to procure a postponement of interest payments on part of the bonded debt of the company. The Pennsylvania Coal Company, also, did not formally agree. The trank line managers have held several meetings and agreed to "pool" earnings on West-bound freights from New York.

The principal dealings of the week have been in Lake Shore, D., L. & W., Michigan Central, Western Union, St. Paul, Northwest and Rock Island. We give below the closing quotations of active shares.

The last bank statement shows unimportant changes, except in the items of gold and legal tender notes, the former naturally showing a decrease and the latter an increase. The total reserve is only,\$34,200 larger than last week, and the surplus reserve \$110,850, the latter now standing at \$17,643,550.

The following is a comparison of the averages for the past two weeks:

May 12.	May 19.	Diff	erences.
Loans \$256,519,600	\$255,894.700	Dec.,	\$624,900
Specie, 23,272,500			1,405,300
Legal tend's 51,066,700		Inc	1,371,000
Deposits, 227,226,000		Dec	580,600
Circulation. 16,068,700	16,069,900	Inc.	1,200

Government bonds at the close were strong.

no dance.	
Bid.	Asked.
U. S. Currency 6s1253	125%
U. S. 6s 1881. reg 114%	114%
U. S. 6s. 1881. cou	11536
U. S. 6's, 1865, new reg	111%
U. S. 6's, 1865. con	111%
U. S. 6's, 1867, reg	11436
U. 8. 6'e. 1867, con	114%
U. S. 6's. 1868, reg116	-
D. S. 6's. 1868, cou	-
U. S. 19-40 reg112%	113
U. S. 10-40 cou	113%
U. S. 5a, 1881, reg	111%
U. S. 5e, 1881, cou	111%
U. S. 4368, 1891, reg10736	107%
U. S. 4%s. 1891, cou	108%
The following are the closing quote	ations of

active shares :	
Bid.	Asked.
Atlantic and Pacific Telegraph 20	211%
Chicago & Northwestern 221/2	2234
" Pref 48%	49
Chicago, Rock Island and Pacific 93%	94
Chic., Bur. & Quincy100	101
Clev., Col., Cin. and Indpls 26%	27
Cleveland and Pittsburgh 831/	8436
Chicago and Alton 8334	8436
" Pref104	-
Canton	21
Del., Lack. and Western 4214	49%
Belaware & Hudson Canal 38%	38%
Adams Express 95%	96%
American Express	47
United States Express	40%
Wells, Fargo & Co. Express 83	84%
Brie	636
Harlem140	148
Hannibal & St. Joseph	1314
" Pref 25%	26
Hlinois Central	58%
Kansas and Texas 434	8%
Lake Shore 49%	50
Michigan Central	4136
Morris & Essex	69
Milwankee & St. Paul	19
" Pref 48%	49%
Mariposa 834	436
" Pref 4	496
New York Central 911/4	9154
New Jersey Central 7%	В
Ohio & Mississippi	534
Pacific Mail	225
Panama	98
Quicksilver	15
" Pref 20%	2314
St Lonis Kansas City Northern 5	514
Pref 97%	27%
Union Pacific 68	89
Western Umon Telegraph 63%	69%
come Amon Totalinhaille	0.1

MINING STOCKS.

Mr. Ogden Haight, No. 65 Wall street, sends us the following report of the business of the New York Mining Stock Exchange for the past

00	PPER STO	CKS.		Sales.
		Bld.	Oftered.	Shares.
Allouez Mining Co.		\$4.50	7.00	
		7.75	8-25	851
Calumet & Hecla M	lin. Co	175.00	179.00	150
Central	Se	39:50	41:00	***
Franklin	44	9:00	11:0	
Madreon	66	*20	-25	
Mesnard	44	-50	1.00	***
Minnesota	44		****	
National	86	25	.50	
Osceola	64	20:00	25.00	
Pewabic	64	1:50	2:50	90
Quincy	68	37:00	40.00	
Ridge	84	3 00	5.00	
Rockland	94			
	GOLD STO	CKS.		
Am. Flag G. M. Co.	Col	109	10	4,400
Bobtail "	98	1:45	1.55	9,60
Lacrosse 44	46	.30	-32	8,50
N. Y. & Col. "		1:25	2:50	0400
Seaton Consolidate	d			****
Alpha, Nev. Gold &		8.00		
Belcher	64	8:00	5:00	***
Best & Belcher	18	10.00	0 00	
Caledonia	44			***
California	46	23.00	****	***
Consol'd Imperial	64	.90	1.00	
Consol'd Virginia	44	23-00		***
Crown Point	66	#9 00	****	***
Eureka of G. V.	44	1:00	3:00	***
Exchange.	44	2 00	3 00	***

Gould & Curry

1						
	Julia, Gold and					
	Justice	44		4.00	5.00	
	Mexican	44		4:00	Pig 4 9	0000
	Ophir	4.8			10.00	
	Overman	20		5.00		0 1 0 0
	Raymond & Ely					0000
	Savage	0.6				
	Segd. Belcher	86				
	Sierra Nevada	8.5		1.00		
	Silver Hill	4.6				
	Union Con.	6.6				
	Yellow Jacket	6.5		4.00		
5		LEAD :	TO	CES.		
E	St. Joseph Lead Co		0 0 0	5.00	6.00	100
6		SILVER	ST	ocks.		
,	Silver Islet Mining	Co		-25		
	TU	NNEL (OOM	PANIES.		
f	Bobtail Tunnel			8.50	4.20	
	MINCI	ELLANI	iou	S STOCK	9.	
	Smith & Parmelee.			.10		
4	Hukill of Colorado					
-	United Petroleum	Farms.		. '(5		
٤			_			

GENERAL HARDWARE.

The demand for goods is gradually lessening as the warm season approaches, but we bear few complaints of dullness, as it is generally conceded that the volume of business is greater than at the same period of 1876. There is very little to be said about values, which are remarkably steady, showing that there is little disporeached an informal and partial agreement to sition on the part of holders to force sales by concessions.

> The demand for American Hardware for European account is steadily increasing, and this business so auspiciously commenced, seems likely to develop into very handsome proportions if proper care is taken by both makers and shippers while competing for the trade, to keep up the quality of the goods. In this connection we may mention the shipment during the week of 79 cases of Hardware to Germany by Graham & Haines.

> We learn from good authority that the Stan ley Works have purchased the entire stock of Wrought Butts and Strap and T Hinges belonging to Roy & Co., including their stocks at their New York and Baltimore warehouses. Taking into account the fact that such goods have for a long time been sold at no profit to the manufacturer, it is reasonable to suppose that this purchase will have a strengthening tendency on the market.

> In Foreign Hardware business continues quiet, and the orders for importation usually placed at this season are, so far as we can learn, disappointing to importers.

The Nail market continues in the same unsat isfactory condition, the nominal price for 10d. being \$2.60 @ \$2.65, and the real price \$2.50, with a possibility of shading even this low figure for a round lot.

The Russell & Erwin Mfg. Co. have just issued Volume 4 of their illustrated catalogue and price list. This catalogue comprises all goods described in Volume 1, 1874, together

somely printed on fine tinted paper, and is throughout fully and comprehensively illus-It is substantially bound in cloth. The first 50 pages are devoted to their assortment of Rim Locks and Latches, and contains a complete list of these goods nicely classified. On pages 51 to 115 inclusive, are shown a great variety of Mortise Locks and Latches, including Mortise Front Door Locks with their patent "R" Latch. Full size cuts of Keys, Knobs and Escutcheons are also shown, and a full line of "Kahala" Bronze Locks, Knobs, Escutcheons, Shutter Bars and Knobs, Cupboard Catches and Turns, Sash Lifts, Coat and Hat Hooks, Bolts, &c., is handsomely illustrated. About 60 pages are devoted to miscellaneous Hardware, including a handsome line of Polished Steel Fire Irons, among which are some new and elegant designs. A good many pages are occupied with new styles of Wrought Iron Padlocks, with Iron and Steel Keys. They also show full sized cuts of Flat Head Gimlet Pointed Screws from % inch to 31/4 inches, and a complete assortment of Cabinet Locks and Keys. As this book contains many revisions in lista beside new goods, it will be desirable that their customers should have a copy as soon as possible, and as the book is too large to be sent through the mails, it will be for warded to their friends with the first goods oing, or will be sent by express if so or

The Taylor Manufacturing Co., New Britain, Conn., are now manufacturing Weed's Patent Faucets without bits. The list price for these goods is the same as Stebbins' Molasses Gates, and is subject to discount 621/4 and 10 and 10 per cent. in case lots. J. Clark Wilson & Co., No. 81 Beekman street, are their New York agents.

We mentioned last week that Horace Durrie Columbus, Ohio. We have since seen their catalogue and price list, in which they illustrate a large assortment of Bench and Molding Planes, Carpenters' Gauges, Tool Handles, Bench and Tail Screws, Hand Screws, Cabinet makers' Clamps, Mallets, turned Woodenware, Coopers' Wood Tools, Tress Hoops, Coopers' Edge Tools, Drawing Knives, Socket Framing and Corner Chisels, Plane Irons, Saw Frames and Bucks, Patent Auger Handles, &c. The following is their discount sheet, issued under late of April, 1877:

To the Hardware Trade.—Having reduced the price of our manufactures, we quote you the following discounts. These rates of discounts apply to our last catalogue of 1876:

Coopers.	Wood '	rools											
Bench an	d Tail S	crew	m										
Hand Scr	OWS AUG	d Cat	inet	Cla	mi	36.							
Mallets-	Carpen	ters'	and	Tip	ner	181							
Turned V	Tooden	Ware.	Sav	F	am	68	ar	d	R	ac	ks		
Coopers'													
Plane Ir	ng.	Post								-			
Dlance w	thou: I	rons											
		10 2 9											
Planes w	th Eng	110B I											
Planes w	th Eng	118B 1	lron	B						- 0		0 0	
Planes w Tress Ho Patent A	ops												

sept Bench Planes. No charge for boxes for Bench and Hand Screws when ordered in full cases. All other boxes charged. Bench Screws packed in cases of one dozen. Hand Screws to 12 in., loclusive, packed in cases of two dozen, and larger sizes packed in cases of one dozen.

J. Clark Wilson & Co., 81 Beekman street, have been appointed agents for Bourne & Knowles, Cleveland, Ohio, sole manufacturers and proprietors of the Messenger ("Comet") Can Opener and the Ritchel ("Universal" Can Opener). The manufacturers say: "Any Can Opener constructed with a cutter or knife connected to a handle or holder, having a point so an infringement on our patent rights." The price of the Messenger is \$3 per dozen, and the Ritchel \$3 per dozen, with a special discount for quantity.

The Keystone Portable Forge Company have issued the following circular:

issued the following circular:

The copartnership heretofore existing between the undersigned, as the Keystone Portable Forge Company, is this day dissolved by mutual consent, Cochran Forbes retiring. DeWitt C. Baxter and Chas. C. Torr will continue the business, and settle up the business of the late firm, and to whom all those indebted to the late firm will make payment.

DEWITT C. BAXTER,

CHAS. C. TORR,

COCHRAN FORBES.

PHILADELPHIA, May 1, 1877.

PHILADELPHIA, May 1, 1877.

We respectfully refer you to the above notice. Having assumed the entire proprietorship of the late firm, we are now, with increased facilities, prepared to meet promptly all orders on the same liberal terms as heretofore.

Our Portable Forges embrace the greatest variety and styles of any offered to the public,

and for lightness, strength and durability, are unequaled. So universal is their adoption, unequaled. So universal is their adoption, their sale is limited to no part of the civilized

Independent of, though in full keeping with the above, we are introducing to the public s full line of Pressure Blowers and Exhaust Fans, upon which we shall spare neither labor noi expense until we have accomplished our obect—perfection.
All communications should be addressed,

KEYSTONE PORTABLE FORGE SO., No. 2.8 Carter street, Philadelphia. DEWITT C. BAXTER, CHAS. C. TORE, Sole Proprietors and PHILADELPHIA, May, 1877. and Manufacturers.

The Nason Mfg. Co., No. 71 Beekman street. have issued, under date of 18th inst., the following discount sheet, to apply to their price list of March 10th, 1876 :

with the additions since made, and comprises all the goods of their manufacture except bronze goods which are shown in Volume No.

2. The book contains 277 pages; it is hand-somely printed as for the somely printed as for the

1	Mulleable Iron Fittings at circular prices and dis-
1	countsnet
1	Iron Cocks:
1	Size 36 % 1 1%
Į	All Iron\$0.331/6 '44 '531/6 '74
1	Brass Plug 0 60 '86 1 07 1 64 net
ı	Size
١	All Iron '92 1'37 1'81 2'64
ı	Brass Plug 2.10 3.17% 5.20 7.75)
ı	Boiler Feed Pumps60
1	Foot Valves, with Strainers 50
1	Iron Valves, etc., Brass Mounted60
1	Nason's Steam Trap
1	Nason's Steam Trap
1	" Glue Heaters
1	FCCU WAICE MCMICE
۱	Damper Regulators
1	Le Van's "20
	Brass Valves, Cocks, Fittings, etc
	Oil Cups60
	Steam Whistles, with Valves60
	Glass Water Gauges60
١	Patent Valves:
	Peet's Patent, Brass
	" " Iron 4" and under
ł	Ludlow's "
	Jenkins' 4 Brass
	" " Iron
	HOM
	Nelson's Lubricators
	Other "special rates Finished Brass Fittings, Iron Pipe sizes (Yanu-
	Finished Brass Fittings, Iron Pipe sizes (Yanu-
	facturers' List)
	Steam Gauges special rates,
	Stocks and Dies
	0 111 01

Chase's "				60				-		6.0								10
Pipe Vises:																		
Nason's Patent	Ope	n i	Ja	w,	W	Ш	t	ak	te	p	ij	Pt	9 8	ĸŧ		àl	ay	
point																	!	80
Dart's Patent C																		
Improved Revo	lving	z V	184	ð.,														45
Angle Vise																		40
Malicable Iron P	ipe V	180	ð								,		. 2	56	1	20	n	et
Patent Pipe Tong	8:																	
Brown's Patent						0 0		0 1				0.0	0			. :	32	36
Patent Tongs,	Relia	ble	81	nd	G	0	od	1	(8	al	n	0	1	is	t		88	
Brown's Pa	tent)																37	36
Rebbins' Chain																		
Barwick's Pater	nt Te	ong	8.								0						27	34
Wrenches, Ratch	et Di	illi	4.	eto	. :													
Coe's Wrenche	B													0.0				41
Baxter's "Stillson's "																		18
Stillson's "																	17	34
Webster "											٠							80
Packer's Rache	t Dr	ille																40
Chapman's "	91																!	20
Pipe Cutters :																		
Stanwood's Pat	ent.																22	34
Acme "																		
Gas Fitters' Plie																		
																		70

We are revising our list prices for Radiators, Iron and Brass Valves and Cocks, and Brass Fittings, Connections, &c., and until the same is ready for distribution it will give us pleasure to furnish special net prices for such goods as are required.

The American Sleigh and Carriage Iron Company, Boston, Mass., illustrate, in their advertisement on page 17, their Patent Malleable Ax Wedge. This Wedge was introduced, we believe, for the first time late last fall. It is from London, May 12, we have the following Paper and Scraps, 13c.; Kentucky Baie Rope, simple and effective, and we are informed that passage: "This metal maintains its position, to impressing with a favorable recention by the and ordinary Soft is firm at #21 10/. Scantch it is meeting with a favorable reception by the

BRITISH IRON MARKET.

(Specially reported by cable for The Iron Age.) WEDNESDAY, May 23, 1877.

Scotch Pig.-Since last report the market bas been depressed, but has recovered somewhat, though prices are not very strong. The following are makers' prices :

Manufactured Iron and Rails un-

IRON.

changed.

American Pig.-Few transactions of importance are reported during the week, and we think there is less disposition to force sales than at the time of our last writing. The sale of 1400 tons Thomas Nos. 1, 2X and 2 at \$17, private terms. Beyond this we hear of nothing more than the usual small lots required for present use. We hear of Forge Iron of standard quality being offered delivered here at \$16, but no transactions at that figure are reported. We quote Foundry No. 1, \$18.50 @ \$19; Foundry No. 2, \$17.50 @ \$18.50; Gray Forge, \$17 @ \$18.

Scotch Pig .- The demand for Scotch Iron continues light. The sale of 100 tons Eglinton on private terms is reported. About 500 tons Scotch Iron arrived at this port during the week for reshipment to Canada. We quote at unchanged figures: Glengarnock, \$27; Eglinton, \$25; Coltness, \$28.

Rails.-No transactions are reported, and we quote as before: Steel, at mill, \$47 @ \$50; and Iron, \$35 @ \$38.

Old Rails .- In the absence of business we uote, nominally, \$19.

Scrap.-A sale of 150 tons Wrought Scrap on private terms is reported. We quote as before, \$24.50 to \$25.

METALS.

Copper.-Sales for the week sum up between much all the speculative lots that were hanging on the market. The first boat with new Copper is expected here the latter part of this week and the second next week. These lots are all sold, and no supply for the general market need be looked forward to till about the middle of next month. Brass manufacturers have bought little or no Copper yet, while the rolling mills laid in a fair supply some time ago. As the mining companies find themselves in a position of great ease, previously explained by us, we cannot but pronounce the Copper market one of great intrinsical strength, and prices susceptible of a material improvement on the first occasion when the Brass manufacturers may deem it advisable or be compelled to purchase. The market closes firm at 19c. @ 191/c on the spot, and 191/c. @ 20c. futures, to be delivered within the next three months. Baltimore we quote 191/c., nominally. The Eng hah market is very much unsettled still, having again declined 10/ on Best Selected, which ha receded to £76. 10/@ £77, and £1 on Chili Bars, dropped to £69. Political matters on the continent again look quite complicated, not to say threatening, and commercial men in France hesitate to operate under such circumstances France being a great copper consuming country the metal is immediately affected by such troubled outlook. As matters stand we shall have to be prepared for continual fluctuations on the other side. There is still a good demand for manufactures, which we quote 31c. for Sheathing and 32c. for Bolts and Braziers : New Yellow Metal Sheathing, 20c. Yellow Metal Bolts, 25c.; and Nails, 20c., net

Tin .- We understand there are telegram in the city reporting an advance of £2 @ £3 in English Tin, while Straits is cabled £71 from London, and \$20.50 from Singapore, with an exchange of 4/1. Although inactive, the mar ket here maintains its firm attitude at the following gold quotations: Straits, 16%c.; English Refined, 16%c.; ditto Common, 16c., and Banca, 181/2c.; all gold, large lots. Mail accounts are to hand from London to the 12th inst., from which we take the following passage: "The advices from the Straits report further supplies are not likely to be intercepted on this account. Australian continues to ar rive in good quantities, and there is not much fear of any scarcity of supply in any description for some time to come." A steady, moderate demand prevails for Tin Plates, which we quote as follows in gold, per box, large liner, ordinary brands: Charcoal Bright, \$6.621/4; ditto Ternes, \$5.85 @ \$6; Coke Tin, \$5.621/2 @ \$5.75, and ditto Ternes, \$5.371/4. The market has to some extent been unsettled by cable advices, informing us that some hundred makers have agreed to reduce work to two weeks out of three. This might prove the turning point, and we trust that henceforward more satisfac tory prices will rule both in England and here.

Lead-Remains in the same dull mood, no sales are reported except a lot of 50 tons Newark we hear of at 5%c., currency. There is a total lack of demand, and we doubt whether for large lots of Common Domestic a better offer than 51/4c., currency, could be obtained at this juncture. Nor has anything transpired in either Foreign or Refined, both equally flat. For the latter 6c., currency, is asked, here, but it seems to us a doubtful matter to place it just at present even at 5%c., currency. By mail

moderate request; Bar at 7%c., Pipe at 9c., and Sheet at 9%c., less the usual discount

Spelter and Zinc .- Domestic Spelter is duli and nominal as before; there is a total absence of demand and but a restricted business. There is no foreign available, and none expected for the moment. We quote the latter nominally 61/2c., gold, and the former, according to brand, 6 @ 61/2c., currency, with some choice Western selling at the latter figure. The Matthiessen & Hegeler Zinc Company, of La Salle, Ill., under date of May 18, quote as follows: "Sheet Zinc, 6%c. for No. 9 and heavier numbers in ordinary dimensions, in 600 pound cacks, on board cars in La Salle. The extras are per 100 pounds: For No. 8 Zinc, 15e.; No. Zine, 50c.; No. 6 Zine, \$1; No. 5 Zine, \$1.50, and No. 4 Zinc, \$2; Zinc packed in 250 pound casks, 20c.; in 100 pound do., 30c.; largest width 40 inches. They quote their Refined Spelter, 5%c. per pound ; terms cash, 3 arranged in relation to said holder as to form an axial pivot for the cutter in opening cans, is 2000 tons Gray Forge (brand not named) on Chicago, 10c." Mail advices from London reach May 12, and read as follows: "The quotation for Silesian is £20. 5/ @ £20. 7/6, and shows but little variation. At the public sale on Thursday 140 tons of Zinc were offered, of which 125 tons found buyers at £24, which is a reduction of 5/ per ton upon the previous sale. Sheet Zinc .- The market still lacks animation at 8c. @ 81/c., gold, Mcsselman, and 7%c. @ 7%c., currency, Domestic.

Nickel .- Manufacturers seem to be well stocked with the raw material for the moment. and the market is quiescent at \$1.85 @ \$2, gold, per pound.

Antimony .- According to cable accounts from London the metal has declined to £48 there; it nevertheless moves off in moderate sized lots at 12c., gold, per pound here.

COAL. During the week there has been a meeting of

the various representatives of the great companies, at which resolutions to suspend operations for a month or more were passed, and to which every one agreed except Mr. Gowen, who is in Europe. A dispatch was sent to him asking for his assent to the proposition, and 300,000 and 400,000 pounds Lake Superior at for the co-operation of his company. He re-19c. @ 191/c., which have cleared off pretty plied after allttle delay, asking that the time for suspension be deferred a few days, and saying that a long letter upon the subject from himself was on its way across the Atlantic. The meeting then, we believe, agreed that the suspension should be put off until the 15th of next month, and the public was given to understand that at that time the Philadelphia and Reading Company, as well as the others, would be ready for a suspension. There was a certain appearance of weakness in all this, but still the suspension was really to be, though circumstances might delay it somewhat. Yesterday, however, the true inwardness of the matter became apparent, and the combination shown to be a myth, by the announcement of auction sales to take place on Tuesday the 29th. Both the Pennsylvania Coal Company and the Delaware, Lackawanna and Western are to sell. The former offers 70,000, nominally deliverable before the 15th, and the latter 150,000 tons, deliverable through the whole month. Trade is, of course, at a stand. The hoped

for advance of 50 cents per ton, to take place in June, is not to be, and the dealer is naturally discouraged, although he talks hopefully and speaks confidently concerning the suspension which is to take place on the 15th. It seems evident that the farce of keeping up the appearance of a combination is nearly over. A few of those connected with the large companies still talk as though they thought a suspension was really to take place in June. The 70,000 tons offered by the Pennsylvania Coal Company is nominally for delivery before the 15th of June, but it bardly seems probable that such sale would have taken place if the company had really supposed that there would be any suspension. The 150,000 tons of Scranton Coal will certainly necessitate the delivery of Coal for some time after the date of the proposed suspension, while the Reading Company have too many season contracts to fill to make it at all probable that a suspension of any kind will have any very marked effect upon the market. From all present indications Coal must take the same course as any other article in Prices must fall until so many producers are driven out of the market that a balance bethe rioting at the mines to be over, so that tween the amount produced and that consumed is restored. We omit quotations.

OLD METALS, PAPER STOCK, &c.

We have no definite charge to report in the condition of the Old Metal, Rag and Paper Stock markets since last week. Business still continues very dull, and prices remain nominally unchanged, with the exception of Wrought Iron and Lead, which have somewhat declined. The purchasing prices offered by dealers are as follows:

Old Metals.-Copper, 14c. @ 15c. per lb. ; Yellow Metal, 10c.; Brass, 8½c.; Composition, heavy, 12c. @ 13c.; Lead, solid, 4½c.; Tea Lead, 4c.; Zinc, 4c.; Pewter, No. 1, 13c.; do., No. 2, 8c.; Spelter, 534c., Wrought Iron, \$18 per ton; Light do., \$10 per ton; Stove Plate, \$9 per ton; Machinery, do., \$12 per ton; Burnt Iron, \$4 per ton.

Rags, &c. -Canvas, Linen, 4%c. @ 5%c.; do. Cotton, No1, 51/4c.; No. 2, 21/4c.; White, No. 1, 41/4c.; No. 2, 81/4c.; Colored, do., 2c.; Weolen, 2c. @ Sc.; Soft, Mixed, 51/2c. @ 6c.; Gunny Bagging, 11/2c.; Jute Butte, 1%c. @ 2c.; Kentucky Bagging, 3c.; Book Stock, 31/4c.; Newspaper Stock, 21/4c.; and ordinary Soft is firm at £21. 10/; Spanish at £21. 5/." Manufactures of Lead are in Rope, 3c. @ 3%c.

EXPORTS

Of Hardware, Iron, Machinery, Metals, &c., from the Port of New York, for the

Week ending May 2:	2, 1877 :
Danish West Indies.	British West Indies.
Quan. Value. Clocks, bxs 8 \$84	Quan. Value. Hdw., pkgs 14 \$193
Hambury.	Hdw., pkgs 14 \$193 Car'ge mtl, pgs 8 248 Coal, tons 100 310
Irons, cs 82 840	Havre.
Mf. fron, pkgs. 11 264 Em'ry wh'is,cs 3 185 Sew. mach., cs 97 1,962 Ag. imp., pkgs 232 4,074 Hardware, cs 89 2,917 Machinery cs 18 2,965	Ag. imp., pkgs 155 6,147
Sew. mach., cs 97 1,962 Ag. imp., pkgs 232 4,074	Iron wheels 8 150 Light. rds, bxs 13 600
Hardware, cs 89 2,917 Machinery, cs. 18 2,065	Hardware, cs. 5 400
Machinery, cs. 18 2,065 Clocks, cs 101 2,179	Copper, bbls 9) 22,500
Pumps, pkgs 24 900	Canary Islands.
Bremen.	Hdw., cs 89 183 Ag. imp., pgs. 24 101
Ag. imp., pkgs 679 12,481 Hardware, cs. 5 125	Oporto.
Car mtls., pgs. 30 150	Clocks, pkgs 56 880 Hdw., bxs 2 50
Mf. 1ron, case. 1 110	
Dutch East Indies.	Hayti. Nails, kegs 100 800
Nails, kegs 5 75 Coal, tons 443 1,829	Nails, pgs 80 93
Dutch West Indies.	Brazil.
Lamps pkgs. 5 71	Clocks, pkgs. 14 450 Hardware, bxs 28 400
Mf. iron, pkgs. 19 161 Hdw., pkgs 11 115	Mach'y, pgs 10 500
Mf. iron, pkgs. 19 161 Hdw., pkgs 11 115 Nails, kegs 20 63	Car wheels 28 250 Car mtls., pgs 9 700
Antwerp.	Cuba.
Clocks, bxs 12 240 Ag. imp., pkgs 36 4,300	Tel. mtls., pgs 111 4,882
Ag. imp., pkgs 86 4,500 Liverpool.	Lamps, pkgs 13 340
Sew. mach.,cs. 103 2,780	Cutlery, bxs. 4 300 Coal, tons 516 1,419
Mach'v, pkgs 15 5.477	MI, 170h, DE28 187 4,003
Pumps, pkgs 7 370	Mach'y, pkgs. 15 2,304 Ag. imp., pkgs 55 1,395
Irons, cs 35 210 Grindstones 18 380	Spikes, kegs. 180 810 R. R. mtl., pgs 468 2,579
Belting, ca 1 137	L'd pipes, cks 3 430
Clocks, bxs 201 3,944	Nails, kegs 400 764 Sew. mach., cs 11 86
	Wire, Dais 230 3,163
Plated ware, cs 2 1,000 Hdw., pkgs 118 3,506	Gas fixt., cs 4 236
Hdw., pkgs 118 3,506 Metal g'ds, cs. 2 320	
London.	Africa.
Metal, cs 10 80 Ag. imp., pkgs 283 7,806	Ag. imp., pkgs 751 10,590 Tinware, pgs 13 185
Mach'y, pkgs. 20 909 Sew. mach., cs 406 6,536	Sow much ca 10 465
Machinery, ca. 12 1,295	Car'ge mtl. pgs 49 900
Sew. mach., cs 325 5,676 Car'ge mti., cs. 18 1,754 Mf. iron, cs 22 2,475	
Car'ge mti., cs. 18 1,754 Mf. iron, ce 22 2,475 Cutlery, pkgs. 49 1,200	United States of Col- ombia.
Hardware, cs 274 5,171	Cartridges, cs. 51 2,178 Wire, colls 266 799
Pumps, pkgs 41 3,137 Gr'dstones, cs. 20 425	Hdw., pkgs 137 6,117
Gr'datones, cs. 20 425 H'se sh's, kgs 607 2,800 Clocks, cs 2 150	Cutlery, pgs., 91 5,661
0100211 0111111 1	
Glasgow. Machinery, cs. 6 1,158	Ag. imp., pkgs 20 687 Tel. imps. pgs 50 588 Nails, kegs 71 218
Iron rolls, cs., 2 142	Nails, kegs 71 218
Ag. 1mp., pkgs 28 1,562 Pumps, pkgs . 14 432 Clocks, bxs 230 6,900	Iron, plates 53 710 Boiler tubes 200 479
Clocks, bxs 230 6,900 Lea. Belt'g, cs 2 600	Sew. mach., cs 30 974
British North Amer-	Clocks, cs 8 687
ican Colonies.	Revolvers, es 1 71 Burners, es 8 550
Mf. iron, pkgs. 45 380 Ag. imp., pkgs 44 471	Venesuela.
Mach'y, pkgs. 15 588	Hdw., pkgs 49 538
	China.
Hdw., pkgs 30 918	Cartridges, cs 1 37

IMPORTS

Of Hardware, Iron, Steel and Metals into the Port of New York, for the Week end-

2,	
ing May 29, 18	77 :
Hardware.	Order.
Boker Hermann & C	Spicosi tone 1011
Packages, 8	Spiegel, tons, 1011 Spiegel, kilos, 203,008 Spiegel, lots, 1
	Spiegel, Kilos, 203,000
Anvils, 60	Spiegel, lots, 1
Hayden P.	Steel.
Packages, 3	Diamond H. & Co.
Hyslop & Garrock,	Cones de Co.
Packages, 1	Cases, 2
Hoe R. & Co. Casks, 1 Knoblanch & Lite	Mitander Nils
Casks, 1	Pieces, 878
Knoblauch & Lite	hen- Mosher & Co.
stein,	Dundles, 21
Iron wire, pkgs.	, 500 Cases, 1
Lau & Garlichs,	Casks, 2 Rockford Watch Co.
Arma, cs., 4	Rockford Watch Co.
Arms, cs., 4 Moore's John P. Son	18. Cases, 2
Gun wads cs. 1	Sanderson G. & Co.
Gun wads, cs., 1 Schoverling & Daly,	Casks, 5 Woodford W. O.
Arms, cs., 6	Woodford W. O.
Gun barrels, cs.,	1 Canon 18
Calabashan Dyman	Cases, 18 Walscheid C. A.
Sulzbacher, Hyman Wolffe,	& Walscheld U. A.
wome,	Steelware, cs., 1
Tillottson L. G. & C	Bundles, 120
Tillottson L. G. & C	o. Order,
Mdse., pkgs., 7	Rods, bdls., 389 Bundles, 810
Galv. wire, lots,	210 Bundles, 810
Galv. wire, lots, Upson & Walton,	ocrap spring, tons,
Wire rone, colls, 2	30
Witte J. G. & Bro.	Metals,
Gun nipples, cs.	
Walscheid C. A.	Bruce & Cook, Tin plates, bxs., 182
Steelware, cs., 1	Tin plates, bxs., 182
Wiebusch & Hilger I	Idw. Byrne Joseph & Co.
Co.,	Tin, ingots, 426 Tin plates, bxs., 1651 Cort N. L. & Co. Tin plates, bxs., 700
Cutlows and he	Tin plates, bxs., 1651
Cutlery and he pkgs., 6 P. W. anvils, 148	Cort N. L. & Co.
D W appelle 14	Tin plates, bxs., 700
Order	Tin, bxs., 617
Order,	Tin, bxs., 617 Dickerson, Vandusen &
Casks, 7	Co.
Cases, 3	Rolled zinc, cks., 20
Arms, cs., 10	Douglass Jas. & Co.
Iron.	Scrap brass, bbls., 1
Brown Bros. & Co.	Grund F. & Cerero,
	Tood pige 1651
Bars, 2853	Lead, pigs, 1651 Hopkins E. T.
C3118, 1040	Hopkins E. 1.
bank of Montreal,	Tin plates, bxs., 2801
Coils, 1346 Bank of Montreal, Bars, 5271	Tin, ingots, 300
Douglass Jas. & Co.	Tin, slabs, 126
Scrap, tons, 10	Lamarsche H.
Fuller, Dana & Fitz.	Zinc. rolled, cks., 119
Bars, 3665 Hopkins E. T. Pig, tons, 150	Naylor & Co.
Hopkins E. T.	Tin plates, bxs., 1450 Tin, bxs., 965 Piza D. M.
Pig, tons, 150	Tin, bxs., 965
Sheet, bundles.	218 Piza D. M.
Lang W. Bailey & Co	Brass, pkgs., 4
Bundles, 39	Phelps, Dodge & Co.
Mitander Nils,	Tin plates, bxs., 845
Bars, 437	Tin plates, bxs., 845 Tin, bxs., 752 Schmidt O. E.
Naylor & Co.	Schmidt O. E.
Bare, 32,157	Lead pigs 4706
Bundles, 49	Lead, pigs, 4796 Scheider Jos. & Co.
Pholos Dodgo & Co	Tin hya 952
Phelps, Dodge & Co.	Tin, bxs., 358
Sheet, bdls., 107	Order,
Phipps, Conde & Co	Lead, pkgs., 1609
Cases, 31	Scrap copper, pkgs.,
Order.	7

Order, Manganiferous ore,

best quality Charcoal Billets (2240), for wire and steel purposes, \$52.50 to \$55; Bars, ditto,

who make Bridge Iron are pretty well sup-There is also a better feeling generally at the Bar mills, and though no great activity is looked for, some improvement seems quite probable. We are glad to note the remarks of our Pittsburgh correspondent last week, and a the latter part of July or lat of August. Man Philadelphia reports shows conclusively that in the course of the markets all this spring. the condition of both markets is about the Shoenberger & Co. continue to quote in 100 same. The best brands in both instances held keg lots at \$3.80 for the former and \$4.80 for for the regular quotations, while the so-called the latter. cheap lots are made from inferior materials. It | Steel,—The most notable feature is that is right that this should be understood. We have no prejudice against Pittaburgh, and have ufacturers are all busy, some of them unable no interest to serve beyond that of making an to catch up with their orders. This is owing absolutely exact report of the condition of our largely to the low prices, in consequence of market. We believe that our mills ought to be which it is taking the place largely of Iron for able to compete with any distant point for the many purposes; and, moreover, the very low Eastern trade, as we are quite sure Pittsburgh price of Domestic has almost entirely stopped mills can hold the Western trade. We quote the importation of the foreign article. the market quiet at 1.75c. to 1.90c. for ordinary Iron, and 2c. to 2.10c. for Best Refined.

Still, it is a cheering feature that there is enough business to give general employment to the mills, and if this continues, as appearances seem to indicate, prices will soon regulate themselves. Sales are at about the following rates as a basis : Tank Iron, 2%c. to 2%c.; Ship Plates, 2%c.; Chute Iron, 2%c.; Flange Iron, 4c. to 41/c., and Best Bloom, 6c. to 61/c. Muck Bar .- We quote \$34.50 to \$36 for

good quality, Philadelphia delivery. Sheet Iron.-The demand is steady at about late quotations. There is nothing like activity in the trade, but the demand is pretty uniform, considering the weakness in prices. We quote: Eastern Refined No. 16 to 28, 3.25c. to 3.9c., according to quantity and quality, and Philadelphia Russia, 8c.

Steel Rails .- There have been no large sales since our last report, and the market is dull and weak. Cash buyers are not in the market to any extent, and others are not considered very desirable, as there is a general feeling of distrust in regard to the securities offered by them as collateral. It is difficult to give quotations with absolute correctness, as holders are anxious to sell and scarcely know themselves what their lowest figure would be until a cash offer is made. Latest sales are said to have been about \$47, and there is no doubt good buyers would be welcome at the same figures. This, of course, refers to strictly cash buyers; others are in the market at higher figures without being able to place their orders. In the absence of recent sales we quote as last week, \$47 to \$58 at mills. Market very dull.

Iron Rails .- The market does not improve as seemed probable a few days ago, and several orders that appeared likely to go through have, after investigation, been declined on account of the uncertain character of the collaterals. There is some business in rerolling, but very few bons fide cash buyers can be found. On a cash basis we quote about \$33 to \$36 at mills,

eccording to terms and quality. Old Rails .- After the heavy sales of last week, the market is rather quiet, and the only sales we hear of are in small lots at about \$21. It would be difficult to place any quantity at over \$20. We quote \$20 to \$21 as the extreme rates both ways.

weaker, and although we make no change in the supply, and holders are consequently firm tion. We quote Cast at \$15 to \$17; Wrought, \$23 to \$25, with sales at inside figures.

PITTSBURGH.

Office of The Iron Age, 77 Fourth Avenue, PITTEBURGH, May 22, 1877.

Pig fron .- Nothing particularly new to report ; business continues very dull. The demand is confined entirely to supplying actual wants, and prices are weak, with free concessions offered on common stock, which is in very fair supply and not wanted. What little | quoted last week will prevail. inquiry there is, is mainly for good Red-shorts.

Forge, \$17.25 to \$18. Special brands still bring \$20 to \$20.50, but the average figure is about \$19 with concessions in some instances.

Blooms.—There is a fair demand, and sales are made at about the following quotations:

Brooms (2464 lbs.), \$42 to \$45;

Northern Ore Blooms (2240 lbs.), \$88 to \$42;

Northern Ore Blooms (2464 lbs.), \$80 to \$42;

Brooms (2240 lbs.), \$80 to \$42;

Brooms (2240 lbs.), \$80 to \$42;

Northern Ore Blooms (2240 lbs.), \$80 to \$80 orders will continue to run, while those having none will shut down. The ruling rates are still quoted on a basis of 1.80c. to 1.90c. for Bars,

in question. No change in prices; for less plied with orders, and numerous inquiries than 200 kegs, \$2.60, 60 days; 200 kegs and up seem to indicate a continuation of the demand. ward, \$2.50, with the usual discount of 2 per cent. for cash.

Horse and Muleshoes.-Very dull, a they have been all this year, and no improve ment is likely until the fall trade sets in-about careful comparison of the Pittsburgh and ufacturers have been very much disappointed

while the iron business is very dull Steel man-

Wrought Tubing .- There is a very fair demand for oil well tubing, but the inquiry for keeps up very fairly, and the mills are mostly running up to their full capacity. Prices are still low, however, and it is claimed that no money can be made at the rates now current. money can be made at the rates now current. sion there since last Thursday. It is probable there will be some changes made in the terms and discounts and that there will be a discrimination made between large and small buyers.

Window Glass .- Business continues dull and unsatisfactory, but manufacturers are waiting patiently for the good time coming. No change in discounts-70 per cent. for lots of 300 boxes. The strikers have all resumed at the old wages, and the factories here are all in operation.

Petroleum.-Our refineries are nearly all Hanging Rock No. 1, Charrunning, and the shipments to the seaboard have been quite large during the past week or two, ranging from 5000 to 6000 barrels per day; but it is complained that prices are unsatisfactory; that the raw article is bringing more money, relatively, than the product. As compared with last week, prices are lower, which is rather strange, as the charters are reported heavy, and the consumption of the raw article is said to be considerably in excess of the pro duction. Some attribute it to the Standard. who, it is said, are pursuing a bearish course in

Superior ores have been more numerous since the date of our last issue, and prices on speculars have been maintained to \$6.75 on the usual terms. The best magnetics have also sold quite largely at \$6.50 to \$6.60, while there have been still more sales of the hematites at prices rang ing from about \$4 to \$4:30, according to the character of the mine. It is expected that the mount of the sales will continue to increase from this time until all the standard ores are

Pig Iron.-The sales of Charcoal Iron ar extremely light, amounting to almost nothing but there is not anything lamentable in this fact, since there is very little Charcoal Iron to Globe Horse Nails. 25 24 25 26 28c. per to be had. The high grades are the only ones for which there is any demand. There is an abundance of Foundry Irons of ordinary quality, and prices are not firm, sales being at \$22 to \$23; but the demand for Blackband and Scrap Iron .- Prices seem to be a trife American Scotch grades continues to exceed quotations, buyers are more careful in selec- Prices are at \$22 to \$24, with no inclination to weaken.

Bar Iron and Nails .- The trade continues fairly active, but with a strong desire among manufacturers to take orders, and a

supply. The opening of the lakes, however, admit Western Rails to this market by water, and it is not probable that higher prices than

BOSTON.

Serap brass, lbs., 505 Tin, brs., 3891

PHILADELPHIA.

Office of The Iron Age, 200 South Fourth St. Philadelphia.

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Office of The Iron Age, 200 South

ST. LOUIS.

Quoted on a basis of 1.80c, to 1.90c, for Bars, (2464 lbs.), \$65 to \$67; Cold-blast Charcoal Plate Blooms, \$57.50 to \$60; run out Anthracite, \$50 to \$52.50.

Bars.—There is a slight improvement in the demand, and the outlook for the time being is a somewhat improved. The demand for certain specialties is again more active; thote firms who make Bridge Iron are pretty well sup-

No. 1.	No. 2.	Mill.	Mot l'd
			\$21.00
	22.50	33.00	20.00
t			
. 35.00	28.00	22.00	22-00
. 96.00	94.50	93.50	****
		-	
	24.00		
Extra		В.	
No. 1.	No. 1.	No. 1.	No. 2.
	-		
95:00	94:00	98:50	22:50
	\$25.00 \$3.00 \$3.00 \$3.00 \$5.00 \$6.00 \$25.00 Extra No. 1. \$5.50	\$25.00 \$23.00 \$22.50 \$25.00 \$25.50 \$25.00 \$25.50 \$25.00 \$25.50 \$25.00 \$2	\$3.00 \$2.50 \$2.00 \$2.50 \$2.00 \$2.50 \$2.00 \$2.50 \$2.00 \$2.5

Hanging Rock	\$25.00 @ 40.00-4 mos.
Fennessee	28.00 @ 30.00-4 mos.
Kentucky	28.00 @ 30.00-4 mos.
Missourl	
Georgia	28.00 @ 30.00-4 mos
Alabama	28.00 @ 30.00-4 mos.
Assorted Bar Iron	@ 21-10 rates.
No. 1 Wrought Scrap	·80 @
Heavy Cast "	·65 @
Light Cast "	°85 @
Old Rails	19.50 @ 20.00-4 mos.
Old Car Wheels	18.00 @ 19.00-4 mos.

CINCINNATI.

1	HOT-BLAST FOUNDRY.
	Hanging Rock No. 1, Char-
u	coal
d	Hanging Reck No. 2, Charcoal 22 56 @ 23 00—4 mos.
ı	
ų	No. 2, " 22 00 @ 24 00-4 mos.
1	" No. 1, Stone-
	coal
	Virginia No. 1, Coke
ı	14 No. 2, " 21 50 @ 22 50-4 mos.
	Ala. and Tenn., No. 1. Charc'l 23:50 @ 24:00-4 mos.
۱	Fannie U. S. Scotch, No. 1 23:50 4 -4 mos.
	Alice " No. 1 25.00 4 -4 mos.
	Am. Scotch, No. 1 22 00 @ 22 50-4 moe.
1	FORGE IRONS.
d	Handan Dask No. 1 Chan

coal ton.	\$22.00 @	22.50-4 mos.
Hanging Rock No. 1, Coke	31.00 @	21'50-4 mos.
Virginia, No. 1	20.80 @	21.00-4 mos.
Ala, and Tenn., No. 1, Charc'l	20:50 @	22.00-4 mos.
Red-short, No. 1, Coke	\$3.00 W	23.00-4 mos.
Cold-short, No. 1, Stonecoal	19.00 @	20.00-4 mos.
CAR WHEEL AND M		
Hanging Rock 9 ton.	#40:00 @	4 mas
Southern and Western Brands	90-00 @	98.100 4 more
Southern and western Drangs	30 00 00	22.00-4 IXON.
ORE.		
Lake Superior Virginia Hematite (Washed)	\$8.50 @	-cash.
Virginia Hematite (Washed)	4:50 @	-cash.
		CONDAC

BALTIMORE.

who, it is said, are pursuing a bearish course in order to prevent outsiders from going into the business and to keep the monopoly intact.

CLEVELAND.

CLEVELAND. May 22, 1877.

Iron Oie.—The sales of all kinds of Lake Superior ores have been more numerous since

	AMERICAN REPINED BAR IRON.	
	1 to 6 wide by 1/4 to 1 thick 1 2-15 to 2/4 e. 1 to 4/4 wide by 1/4 to 2 thick 1 2-15 to 2/4 e. Round and square, ordinary sizes, from	B P
1	% to 2 inclusive	65
1	Hoop Iron, 1% wide and upward 3% to 3%c.	48
l	Band Iron, from 11 to 4 in. wide 8 to 31c.	88
1	Horse Shoe Iron % to 1 wide by % to %	
l	thick 856 to 4c.	66
I	Norway Nail Rods 6 to 6 % c.	
ı	Black Diamond Cast Steel, Flats, Squares	
ı	and Octagon, ordinary sizes 14% to 15c.	46
ł	Machinery Steel 8to 9c.	68
ı	Cast Spring Steel 7% to 8c.	64
١	Homogeneous Steel Plate81 to 9c.	84
I	Perkins' Horse Shoes, per keg of 100 lbs \$	
ı	R. R. Spikes	to Sc
1	Common Horse Nails, from 14c. to 18c, per pound	1.
١	10 9 8 7 6	
I	Putnam Horse Nails, 23 24 25 26 28c. p.	er T.

Messrs. R. C. Hoffman & Co., Iron and commission merchants, No. 23 South Frederick street, report the Pig Iron market as follows, under date of May 21: The Iron market remains unchanged; demand moderate at about

Baltimore	Char	aos			9	0 1	 		0		۰		 .1	\$29	10	10	0	81.4
Virginia	6.6		0.0				 							95	34	00	0	82-(
Anthracite	No.	1					 							21	19	00	a	22-(
16	No.																	
84	No.																	
White and	Mort	led							ľ									17.0

RICHMOND.

consequent cutting in figures.

Old Rails.—For future delivery there seems to be an abundance of Old Rails, but for immediate use the demand is in excess of the

Va. Co.	d-blast	Char	COMI	Ne	Utr	al.,	 . 30	.nn @	23.0
Anthra	cite, N	0. 1 X					 . 21	.000	22'(
66.	N	o. 2 X					 . 20	000 @	21 (
6.6	N	0. 2					 . 19	100 @	20.6
Coke, I	No. 1 X	(Quir	nim	ont)		 . 23	·00 @	1
56 7	No. 3 X		8-6				. 99	00 @	

- COKE.	18
No. 1 Foundry, extra. \$21.50 No. 1 Foundry 19.50 No. 3 Foundry 17.50 Brown 16.00 Brown 16.00 Brown 16.00 White and Mottled 15.00 Brown 15.0	ER
HOT-BLAST CHARCOAL.	100 100
No. 1 Foundry, extra \$21.50 @ 32.50 No. 1 Foundry 19:00 @ 20:50 No. 2 Foundry 18:00 @ 19:00 Gray Forge 16:50 @ — White and Mottled 16:00 @ —	2 8
COLD-BLAST CHARCOAL.	
Car Wheel Metal	b

Old Car Wheels.... Old Rails... Brown Hematite Ore, 50 to 56 per cent. per ton. Si 73 @ 245 cent. per ton. Si 73 @ 245 .. 1.50 @ 1.75

LOUISVILLE.

Messrs. Geo. H. Hull & Co., under date of May 21, write us as follows: Market prac-tically unchanged. Fair demand for working purposes, but few purchasers for the future. The usual time, 4 months, is allowed on the quotations below:

FOUNDRY IRONS.

	No. 1 Hanging Rock, Charcoal	\$2.00 @ 25.00	
	No. 1 Southern, Charcoal	29.20 @ 25.00 28.00 @ 22.00	
	No. 1 Hanging Rock, Stonecoal and		
	No. 2 Hanging Rock, Stonecoal and	23.00 @ 24.00	
	Coke	21.00 @ 22.00	
	No. 1 Southern, Stonecoal and Coke	21.00 @ 21.50	
	No. 2	20 00 @ 21 00	
	"American Scotch"	23.00 @ 23.50	
	Silver Gray	19.00 @ 31.00	
	MILL IRONS.		
	No. 1 Charcoal, Cold-short and Neut'l. No. 1 Stonecoal and Coke, Cold-short	30.00 @ 31.00	
-	and Neutral	19.50 @ 90.50	
Į	and Neutral	19.00 @ 19.50	
	No. 1 Missouri and Indiana Red-short. White and Mottled, Cold-short and	24:00 @ 24:50	
	Neutral	16.00 @ 17.00	
í	CAR WHEEL AND MALLEABLE IS	IONS.	

FOREIGN

FRANCE, ur des Interete Materiels)

FRANCE.

(Montieur des Interets Materiels).

PARIS, May 6, 1877.— Metals.—The European metal markets, and those of France in particular, have remained apathetic during the week, with the sole exception of Lead. Copper.—Although the visible europity has diminished somewhat, and prices have declined to a point below the intrinsic value of the metal, purchasers for consumption still operate with a great deal of hesitation, held in check, as they are, by the unsatisfactory general state of affairs. Copper here is languishing, and prices are sustained with some difficulty; the following are the quotations: Chili Bars, 190 francs; common do., 182-50; Slabs and Ingots, 192-50; English Best Selected, 196, and pure Corocoro Ore, 187-50. Copper is weaker at Havre, where Chili Hars, first brands, are worth; good current do., 181-25 to 182-50, and Lota and Urmeneta, 180. The Marseilles market is quiet, Red Tokat, there, 185 francs; small Refined Ingots, 185; Sheathing, 225; Bolts, 235, and Yellow Metal Sheathing, 280. Tin.—The still gradually increasing London stock, and generally unfavorable statistical aspect, have thus far sufficed to prevent much of a recovery in values. Very little has transpired here, and prices are feebly sustained; we quote Banca, 192 francs the 100 kilos; Billiton, 183; Straits, 187-50. Australian, 186-25, and English, 185. Marseilles has been quite firm; Banca at 195; Straits, 185 to 190; Billiton, 185, smalls, 185 to 190; Billiton, 185, smalls, 187. England and Germany by the war as readily as had been anticipated, but as there is an actual scarcity of Spanish Lead, we expect a more rapid advance soon. No particular animation has developed in oue own market yet; we quote French, 52-50 francs the 100 kilos; Spanish, 15-75; English, 51-75, and German and Belgian, 52-50. Nothing is doing at Havrowhere the metal is nominal at 54 francs. Marseilles is firm; first fusion, Soft, 50-50 to 51; second fusion, 56; Sheet and Pipe, 57, and Shot, 55. Spetter begins to sell once more at more satisfactory rates

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BELGIUM.

BELGIUM.

(Retus Universitie).

BRUSSELS. May 6, 1877.—Iren.—There is yet much to be wished for as regards business in the Iron districts of Belgium. Thus far this spring season the tendency of prices, if anything, has all along bees a downward one, nor can we discers anything in the immediate future likely to produce a contrary effect, or at least stop the decline. For a loag time past we have entertained and expressed hopes that values had at length touched bottom; but these wishes remain unfulfilled, as the prices at which the tenders under adjudication go sufficiently to prove. Competition among manufacturers has been driven to the utmost extremes at these government adjudications, and this equally applies to rolling stock for state railways and to so-called fixed material, such as Rails, Iron Sheds, &c. In a couple of days another such government opening of tenders will come off of some importance, and we shall witness another great decline through extreme cagerness on the part of producers to ease themselves of some the part of producers to ease themselves of some stock on hand. The Willebroeck Company has been awarded by the Dutch government the furnishing for Java of 28 iron railroad bridges, and 113 ditto small ones for foot passenger traffic; the same company has also obtained an order for all Iron Sheds attached to the depots of the Roman railroads; and, furthermore, for railroad bridges in Upper Italy.

GERMANY.

(Borsenhalle).

Hamburg, May 5, 1877.—Metals.—The German Parliament, by a vote of 211 against 11, has rejected the amendment to levy compensatory duties on Iron and its manufactures imported from abroad. There is some revival observable in industrial circles in the general metal line in Germany, brought about, we presume, by secret orders from Hussia. Copper has as yet given no signs of increased activity, and prices remain the same as heretofore reported. Berlin is quiet at the following quotations: Good qualities English and Australian, 78 to 83 marks the 50 kilos., and Mansfield, 79 to 79 50. Stettin sustains the quotation of 90 marks. We quote Droutheim here 82 marks; Minnesota, 101; Quincr, 92, and Tough Cake, 77 to 78. The statistical exhibit of Tin in England and Holland is not calculated to come to the relief of our markets, which remain unmoved. Berlin maintains figures, not without difficulty, at 77 to 7759 marks the 50 kilos, for Banca, and 75 to 75 50. This market and Stettin remain unchanged. Lead begins to be stirred up; still no positive advance can as yet be noted. Berlin is firm at 30 50 to 21 marks the 50 kilos; Stettin at 25 50 to 26 for Spanish, and 22 50 to 24 for German 22 50 to 25. Spelter.—The ample, stock in England is still an impediment to much of an improvement in prices. Berlin is sustained at 80 to 21 marks the 50 kilos; Stettin at 21 250 to 26 for Spanish, and 22 50 to 24 for German 22 50 to 28. Spelter.—The ample, stock in England is still an impediment to much of an improvement in prices. Berlin is sustained at 80 to 21 25 marks the 50 kilos; Stettin at 21 250 to 24 50, and our own market at 21 250 to 26 for Spanish, and 22 50 to 24 50, and our own market at 21 250 to 26 for Spanish.

HOLLAND.

(Koch & Vlierbe

ROTTERDAM, May 8, 1877.—Tis.—The market has become firmer. Sales have been affected of Banca, o be delivered from the pending May sale, at 48% and 43 guilders, and of Billiton "to arrive" at 41%

Export of Tin from Holland. 1877. Total..... " 603 624 559 Two Months. 11 Total..... " 1160 919

CHINA. (Arnhold, Karberg & Co.)

(Arnhold, Karberg & Co.)

CANTON. April 11, 1877.—Metals.—Lead.—But little business on the spot is reported, the Chinese only submitting low offers. Holders are firm in anticipation of an improvement at the approach of the teaseason. Sales during the fortnight, 1000 pigs. We quote the metal, \$7.40 to \$7.52\footnote{Stocks are increasing and dealers are not anxious to operate at current rates, except to supply immediate requirements. Sales, 1500 slabs; we quote the same \$18.50 to \$21.75 per picul. Quickeliver.—Notwithstanding the large supplies offering, the tone of the market is in no respect worse, and quotations remain on a parity with those last given. Sales, 3800 flacks. We quote Spanish, \$61 to \$61.50, and California, \$62 to \$62.59 per picul.

EAST INDIES. (Dummler & Co.)

(Dummler & Co.)

BATAVIA, Java, March 29, 1877.—The next action sale of 10,000 piculs Billiton will come off on the 9th proximo. There have been shipped to the United States direct since July, 1876: 20 tons against 19 and 16 the previous two years during the corresponding period. Coal is utterly neglected. Some 1400 tons Lambton per steamer Lord of the Isles, from Sydney, have been realized at 12 guilders per ton from alongside, cash. Exchange.—First-class credits on London are scarce, and worth 12 05 to 12.19 guilders the £ sterling, 6 months' sight.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

> (From our Regular Correspondent.) SHEFFIELD, Eng., May 7, 1877. THE WAR

still engrosses the close public attention of this country, and is the one absorbing topic of conversation among all the classes. To-night Mr. Gladstone's resolutions-which the Times declares nobody can understand, because they are utterly meaningless-will come up for discussion in the House of Commons. I shall not dwell on the subject, for the result of the debate will be known to- you long before this achieves the honor of type, further than to say that Mr. Gladstone's conduct is heartily condemned by the majority of the people of the country, and his former rank and file are now deserting him. There is, apart from this ques tion, a growing feeling, however, that the in terests of England in the East are so vast and so important that it will be next to impossible for her to remain neutral for any length of time. It is not, therefore, by any means surprising to read that there is much activity at our chief dockyards and at the various victualling and clothing depots. The Thunderer, at Portsmouth, has been hastily commissioned, and several other vessels, iron and otherwise, are ready for being launched. On the Clyde, the corvettes Nelson and the Northampton are being pushed on as rapidly as possible They are each armed with four 18 ton, eight 12 ton and six torpedo guns. Messrs. Elder & Co. have also six steel corvettes on the stocks, to carry 14 guns each. Messrs. Tnomson, of Dalmuir, are building two gunboats, and there are many others in various stages of progress at Barrow, Liverpool, Gateshead, Jarrow and Hull. It is fully evident that Great Britain means to fight the moment its "properties" are threatened, and that the whole of the continent of Europe is in such a state (vide Von Moltke's speech passim) that a single spark may set the whole ablaze, and give us another bloody series of years similar to those which preceded the final coup of Waterloo. Many vague rumors are affoat, among others that

ENGLAND HAS WARNED BUSSIA ENGLAND HAS WARNED RUSSIA that this country emphatically repudiates the Russian assumption that the Czar bes gone to war with the approval and authorization of Europe. Rumor further states that the British Cabinet has not only said this but has warned the Russian diplomats that, although England will maintain a strict neutrality as between Russia and Turkey, she will be prepared to maintain at all hazards her interests in the East the moment they seem to be endangered. East the moment they seem to be endangered. This may be so, of course, but I should rather doubt that any formal expression as such had been made by the government. It would be supererogatory to do so, since the fact is self-evident and always existent, independent of the question raised by the present European struggle. From this and other causes, however, our markets are excited, and

CORN HAS GONE UP

to an alarming extent. Wheat has, in three weeks, become nearly 20/per sack dearer, with a consequent rise of nearly a shilling per stone of fourteen pounds of flour. Other breadstuffs of fourteen pounds of flour. Other breadstuffs ure also dearer, but it is felt on all hands that for an action is concerned, the high prices will are to come down as soon as consignments from America and India can be got affort. At the same time some people here think that four "Grangers" and other farmers will reap a benefit from the panic, and so lay the foundation for an early revival of trade in the States.

THE LONDON SHIPPING TRADE is already suffering from the war panic, as is shown by the following statistics obtained from an official source: "The number of ships

bave caused quite a crop of handy little inven-tions to spring up, some of them proposing to annihilate several thousand men at one turn of a handle; others to hoist iron-clads sky-high by the pressure of a button; and one, the latest, to destroy an entire army by the ingenious opera-tion of "land torpedoes." The worst of all these contrivances is that most of them are calculated to be rather more dangerous to friends than to enemies. At the annual meeting of

BIRMINGHAM GUN TRADE,

BIRMINGHAM GUN TRADE, last week, the chairman, Mr. Buckley, drew attention to the great falling off of the gun trade of this country and the great increase of that of Belgium. At the Birmingham proof house only 466,748 barrels had been proved during the year, as against 695,554 in the previous year, the falling off being doubtless partly due to the completion of the contract for Manses guns for the German government by the Nagura to the completion of the contract for Manses guns for the German government by the National Arms Company. In Belgium last year the number of barrels proved was 603,561, or 136,813 more than in this country. Since 1873, in fact, the Belgians had, on the average, proved 95,000 per annum in excess of Birming-bam—a state of things which the president thought deserved immediate and close attention. In a leader on

MODERN ARMOR PLATES

MODERN ARMOR PLATES
the Engineer says: "In recent times the science
of naval gunnery bas made such great strides
onward, that its present status, to all intents and
purposes, amounts to a complete revolution of
the state of things which existed a few years
ago. We are not now content with our modest
74 pounders, or even the Armstrong guns
which figured so conspicuously in the Crimean
war, but we have since shat time steadily progressed until by a gradual increment of size and
improved modes of construction, we have now gressed until by a gradual increment of size and improved modes of construction, we have now attained to what we call 80 and even 100 ton guns. In proportion, too, as these attacking powers have grown, so also have cur means of defense on shore and afloat been brought to a corresponding point of perfection. From the 4 in. and 6 in. armor plates first produced by the energy and enterprise of Sir John Brown, of Sheffield, we have gradually and rapidly gone on until the armor plate manufacturers of the present day have turned out iron armor plates 26 in. and 24 in. thick. Some time back plates of 23 in. thickness were produced armor plates 36 in. and 24 in. thick. Some time back plates of 23 in. thickness were produced at the Cyclops Works, of Messrs. Cammell & Co., of Sheffield, on behalf of the Italian government, and since then John Brown & Co. have managed to roll plates of the still greater thickness of 26 in.—plates, in both instances, which have been pronounced the perfection of iron armor. The Italian government, however, for reasons best known to its naval administration, has decided to employ steel as the material tor plating its two new war ships, the Dullio and the Dandolo, and has, therefore, given the order to Messrs. Schneider, of Creusot. With this particular instance we have, of course, this particular instance we have, of course nothing to do, except to recognize it as being nothing to do, except to recognize it as being the first case in which steel has been regarded as a suitable material for naval armor. Tha the first case in which steel has been regarded as a suitable material for naval armor. That steel may in future be more generally adopted seems quite probable, seeing that our own government is at the present time about to enter upon a series of experiments with it at Portsmouth with plates specially prepared for the purpose by one of the two great Sheffleld firms. These plates, we presume, will be of rolled steel, no cast steel plates having, to our knowledge, ever yet been submitted to the crucial test of being fired at. A patent for casting Bessemer steel in suitable molds for this purpose was taken out a few years ago, but has Bessener steel in suitable molds for this purpose was taken out a few years ago, but has never, we believe, been practically used. Bearing in mind, however, that steel is in one sense so much lighter than iron with equal resisting power, it would appear to be by no neans improbable that the armor of the future for ships of war may have to be made of the tarmer me. of war may have to be made of the former ma-terial. The results of the forthcoming experiments will, therefore, be awaited with a good

PROM GERMANY

we learn, through the medium, on this occasion, of the Berlin correspondent of the Times, that trade is in a wretched condition—a state of things mainly attributable to the injudicious use of the five milliards of money extracted from France at the close of the late war. rome ty this, it is said that Bismarck advocates a return to indirect taxation, and a system of "mild protection" in order to encourage the struggling industries of the country. You will see, however, that the German Parliament has rejected Dr. Monck's prohibitive bill.

PROTECTION OR FREE TRADE?

British products of the same class. But if the preference for foreign over English-made hardwares should become of wide extent he would experience manifest disadvantage in the diminution of his customers, since the English manufacturers and their operatives would be deprived of the means whereby they become purchasers. Hence ironmongers in Birmingham and similar hardware towns are not gratified at the setting up in their midst of depots for foreign hardwares, nor do they regard with favor the utterance of sentiments which are calculated to encourage this competition by the misleading of the hardware operatives.

"Mr. Mardonald, M. P., who is at the head of the Colliers' Union, has in different parts of the kingdom been denouncing the fear of foreign competition as a burdear invented by greedy employers to help them in grinding down their workpeople." Mr. Macdonald is not an acknowledged authority on political economy, but he has considerable influence among the operative classes. Mr. Macdonald would have us believe that English iron makers and hardware merchants have nothing to fear from America. He argues that so long as we can place from on shipboard within an hour of its leaving the furnace, and America has to transport hers hundred of miles, it is utter folly to talk of the competition of America has to transport hers hundred of miles, it is utter folly to talk of the competition of America. Mr. Macdonald's argument ought to

tons, 65 foreign steamers of 36,142 tons, and 64 foreign sailing vessels of 16,385 tons. These figures show a decrease of 81 in the number of slips cleared and a decrease in the tonnage of 35,818. The disturbance is the more evident as the clearances for the four months of the present year show an increase of 90 ships and 8765 tons, as compared with the first four mouths of 1876. The figures were: Number of ships, 1983; tons, 964,300. In 1876, 1863 ships; tons, 55,535."

THESE WARLIKE TIMES

THESE WARLIKE TIMES

THESE PRICE OF RIVETS.

THESE PRICE OF RIVETS.

THE PRICE OF RIVETS

The Ironmonger also has an instructive article on the rivet trade of a part of the Black Country, from which I select the following passage: "No buyer of rivets need be told that there is now and then a wide difference in the quotations of firms who might be supposed to have equal advantages and disadvantages, and to be therefore incapable of underselling one another. Of this some explanation may be found in the practice to which last month we drew attention—that of requiring the workpeople, if not to take out a portion of their wages in kind, then of expecting them to purchase household requisites at what are locally termed the requisites at what are locally termed the em-ployers' 'tommy shops.' Compared with six or eight years back, there is much less evasion than heretofore in the Black Country localities of the Truck Act; but the Act is still evaded and nowhere more so than in connection with the rivet trade of Rowley Regis and Black

the rivet trade of Rowley Regis and Black Heath.

"There are only 17 masters in the two towns, employing about 180 men, and there are 14 truck shops. Practically, therefore, so far as Rowley and Black Heath are concerned, the two things go together, and a truck shop is merely a branch, and perhaps the most profitable branch, of the rivet trade. The rivet maker may employ two hands or four, or a dozen or twenty; in any case he finds it very much to his advantage to keep a store where his men, by a system of indirect, but none the less effective compulsion, are compelled to purchase from him at exorbitant rates bread, butter, cheese, bacon, candles, penny tarts, or boot laces at four for a penny. The truck shop is, in fact, so much a part of the rivet business, and is so much calculated on as a source of profit, that any man beginning to trade in rivets would now find it impossible to compete on fair terms unless he embarked in the grocery business as well."

THE WEEK'S FAILURES

THE WEEK'S FAILURES

have been numerous, but not on a large scale. At Hull, Messrs. Hoischilld & Lowe, seed merchants, of London and Hull, have falled, owing £75,000. At Sheffleld, Mr. Aaron Marks, merchant, has petitioned with debts amounting to £22,000. In the latter case many of the creditors reside in the United States and elewhere ors reside in the United States and elsewhere out of Great Britain, the debtor having carried on an extensive business as an importer of clocks, watches and other fancy articles.

THE SCOTCH PIG IRON MARKET has been very firm during the week, and a good deal of business has been transacted at higher prices. There are now, nevertheless, 132,341 tors in Connai's stores—an increase of 3212 tons on the week. Freights to America are unchanged.

Writing from Glasgow, May 1, Wm. Colvin & Co. said: "To-day numerous transactions took place up to 55,7094, cash, but during the afternoon a slight reaction occurred, and as low afternoon a slight reaction occurred, and as low as 55 7½ was accepted, closing with buyers at that price, sellers asking 55 9. The advance in makers' iron during the week has been very decided, and the tendency is still upward."

On May 4 (evening), James Watson & Co., Glasgow, reported: "The Scotch iron market opened firm this week, with a large business done on Monday and Tuesday from 54/10 to 55/11, cash; since then the price has been steady from 55% to 55/5, cash, closing buyers at the latter figure, sellers at 55/6 per ton. Makers' iron is in better demand and prices are all further advanced. Shipments last week were 13,390 tons, against 13,524 tons in the corresponding week of 1876." We quote:

G. M. B., at Glasgow

Cambrose
Calder, at Port Dundas
Glengarnock, at Ardrossan
Eginton,
Dalmeilington. 51/6 54/6 56/ 54/ 54/6 57/ 53/

The prices current of John E. Swan & Bros., Limited, Glasgow, May 4, gives Gartsherrie No. 1,65/; Coltness No. 1, 70/; Glengarnock No. 1,61/; Eglinton No. 1,57/6, and ballast pig iron, 47/6 per ton, alongside in Forth or Clyde.

TRADES OF SHEFFIELD.

The state of commercial feeling here during The state of commercial feeling here during the week has not been at all satisfactory. It is regarded as being satisfactory that the strict neutrality of Great Britain should have been proclaimed, yet few people suppose that that position could or would be malutained in the face of any attempted attack on Constantinople, or an extension of Russian territory in Asia Minor. As things now are, the whole of the Mediterranean, Levant, South Russian and Asiatic trade is cut off, and will, without doubt, remain so during the whole of the present war. This alone is a most serious matter for Sheffield, inasmuch as these markets are our some quantity, and declined again as quickly I take the following from the *fronmonger* of May lat: "Free trade is based upon the principle of securing, as far as law can secure such an end, the greatest good to the greatest humber. By this principle we imagine England will continue to be guided, quite regardless of what France, America or Germany may say or do. But we have not yet carried the principles of free trade to the extent of preferring the interests of a hundred million foreigners to those of our thirty million countrymen. The English shopkeeper may get as much profit by selling French, German, Belgian or American hardwares as he would by selling British products of the same class. But if the preference for foreigh over English-made hardwares should become of wide extent he would except the same class. But if the preference for foreigh to ver English-made hardwares should become of wide extent he would except may feet disadyantage in the district could or would be maintained in the face of any attempted attack on Constantinople, or an extension of Russian territory in Asia Minor. As things now are, the whole of the Mediterranean, Levant, South Russian and Asiatic trade is cut off, and will, without doubt, remain so during the whole of the presents of respective to the extent of prefering the interests of a hundred million foreigners to those of our thirty million country and mild become an extension of Russian territory in Asia Minor. As things now are, the whole of the Mediterranean, Levant, South Russian and Asiatic trade is cut off, and will, without doubt, remain so during the whole of the presents of the whole of the presents of the whole of the mediterranean, Levant, South Russian and Masiatic trade is cut off, and will, without doubt, remains od during the whole of the presents of the whole of the post of the whole of the whole of the mediterranean, Levant, S and other similar goods, which are largely made hereabout, at Lincoln, Grantham, New-ark and Gainsborough. So far as the iron trade ark and Gainsborough. So far as the iron trade proper of this locality is in question, I cannot give any details which would possess the merit of novelty. The pig and merchant iron branches remain very quiet, and there is a tendency to force transactions even at lower prices than those lately current. Such sales, however, cannot possibly bring any profit to the venders of merchant iron, and it is extremely doubtful whether smelters are doing more just now than holding their own. In some of the manufactured iron branches there is, perhaps, a trifle tured iron branches there is, perhaps, a trifle more work in hand, but even they are not doing more work in hand, but even they are not doing anything like an encouraging amount of work. At some of the leading foundries, such as Thorncliffe, Staveley and Butterley, there is a fair production of pipes and other heavy work, but at Sheffield even the armer plate departments are by no means fully engaged, despite the disturbed state of the political atmosphere. The fact, in this respect, appears to be that, in expectation of at least one severe naval engagement between the Turkish and Russian ficets, the other powers are not desirous of ordering the other powers are not desirous of ordering more iron armor until they see how the existing system acts under fire. To this is also to be added the fact that steel may shortly wholly American official source: "The number of ships cleared with cargoes during April was 477, repleased by the cargoes during a correct one; but, unfortunately, it is not be understant to the Russian occasion I made some allusion to the Russian occasion I made some allus

Other Russian orders have been offered here

Other Russian orders have been offered here within the past few days, however, without the necessary guarantee, and have, in consequence, been decined—a very natural precaution under the circumstances, one would suppose. In the Bessemer and steel rail trades there is no special change, only a few of the newer houses being at all well engaged. One such firm is now running off an order for 17,000 tons of steel rails for Russia for prompt delivery, and a second concern has an order in hand for the same power. Steel tramway rails for local use have also just been rolled here to the extent of several hundred tons. In the cast steel of several hundred tons. In the cast stee trade the depression remains almost wholly unelieved, and there are no tangible signs of any ossible improvement in the immediate future, cool steels for local and Birmingham use are noving off fairly well, and the sheet rollers are moving off fairly well, and the sheet rollers are doing a moderate business, especially those who have a long established connection with the Birmingham Len makers, and the American manufacturers of clock springs, plow plates, shovel molds and bevoled plates are also selling for export in small lots.

The local engineering branches are fairly well engaged in some respects, while in others they

engaged in some respects, while in others they are dull. I believe the Yorkshire Engine Com-

are dull. I believe the Yorkshire Engine Company is working off a pretty good order for locomotives for the Indian State lines, baving also some time ago completed an order for engines for the Tiffis line of railway. Other local concerns are producing water works' pumping engines, colliery winding plant, and other similar machinery, but not on a large scale.

The directors of Wheatman and Smith (Limited) have declared an interim dividend at the rate of 15 per cent. per annum for the half year ending March Slat. The directors of the Neepsend Rolling Mills Company (Limited) have declared dividends of 6/per share on the first issue, and 4/per share on the second issue have declared dividends of 6/per share on the first issue, and 4/per share on the second issue out of the profits for the past year. The question of there being coal in South or Mid-Lincolnshire has received an unexpected solution by the finding of a seam of coal in the southwestern extremity of the county. This seam was struck by some borers on the premises of Mr. W. Barraud, Billinborough, while sinking a well. The coal is said to have been of very good quality, but no particulars are as yet forthcoming as to the thickness of the seam or the depth at which it was encountered. The the depth at which it was encountered. The sinkings at Scarle, near Swinderby, have so far proved unsuccessful, although a depth of 2030 ft. has been penetrated. In boring to this depth the alluvial strata was 10 ft. thick; the depth the alluvial strata was 10 ft. thick; the lower lias clay and limestone, 65 ft.; the rhetic beds, 66 ft.; the new red marl and sandstone, 1859 ft.; the permians, 40 ft., and the carboniferous strata, 130 ft. It is hoped that the effort will be persevered with, as the discovery of coal there would prove of the greatest possible advantage in the working of the ironstone deposits on the surface. stone deposits on the surface.

BIRMINGHAM AND STAFFORDSHIRE.

The South Staffordshire blast furnace proprietors met on Thursday and resolved to give fourteen days' notice, from May 12, of a reduction of 10 per cent, from the present wages of all blast furnacemen. This step is taken in consequence of the continued depression of trade and the increased dearness of money, the bank rate of discount, having been raised to 3 trade and the increased dearness of money, the bank rate of discount having been raised to 3 per cent. During the past few weeks several furnaces have been blown out in various parts of Staffordshire, by which means the output is being brought within narrow limits. There is no quotable change in the finished iron market, best branded bars being still officially held at £9; Lord Dudley's, £9. 12/6; common bars, £6 to £6. 10/, and medium, £7. 10/ to £8. In hardwares there is only a very quiet business doing, the opening of the shipping season having proved of comparatively little advantage so far. The South American markets, especially Chill and the River Plate, are probably the best buyers at present, but even their demands are not of an extensive kind. With India there is a moderate amount of trade, but Australia is not quite so fertile as it has been.

SOUTH WALES AND MONMOUTHSHIRE.

There was rather more iron than usual of late shipped from these ports last week, the total attained having been 3002 tons from Newport and 778 tons from Cardiff. That from Newport went 1000 tons to Verkebach, 980 tons to Aar went 1000 tons to Verkebach, 980 tons to Aarhus, 800 tons to Gottlenburg and 222 tons to Venice. From Cardiff 373 tons went to Sandswall, 360 tons to Christiana, a small lot to Antwerp and another small lot to Bilbao. At Cyfarthfa nearly 400 hands were last week paid off, thus reducing the men employed to the smallest possible number. The tin plate trade, as a whole, is quiet, the only makers doing any work being a few in and near Swansea. Some work being a few in and near Swansea. Some of the Liverpool tin plate houses are said to have been very heavily hit by the faifure of one of your leading import firms.

THE METAL MARKETS

suddenly from 203 to 2.1, which was paid for some quantity, and declined again as quickly to £69. 10/, which is our present quotation. Australian advanced from £68. 10/ to £70, and has declined again to £68. 15/. English is quoted £73 to £75; Banca, 43fl.; Biliton, 42fl. Tin plates still obtainable at low prices. Lead has been in demand, and advanced from £31. has been in demand, and advanced from £21. 10/to £21. 15/ for English pig; soft Spanish, £21 to £21. 5/. Spelter still quoted £20. 5/ to £20. 10/. Quicksilver, £7. 5/. Antimony, £49. to £50."

Messrs, Kelly & Co., London, thus remark Messrs. Kelly & Co., London, thus remark:
"In Cleveland, notwithstanding a good deal of reticence thereon, more sales have been 'jotted down' in the last ten days than in several times ten days previously. We think this will go on, for reasons which we have frequently stated. When buyers in a body 'ask for information,' it may fairly be inferred that 'trade requirements and prompt cash' are not in the far-off distance. The pig demand at Glasgow has been quite in sympathy with Cleveland, and these two iron centers we think will lead to a corresponding improvement of tone in other important iron districts. Hedomadal metal reporters should not allow themselves to be bemportant from districts. Accommand measurement or terms should not allow themselves to be be rayed into impatience. It is sometime trength to sit still. It is satisfactory to hear the still of the satisfactory of the satisfact strength to sit still. It is satisfactory to hear that the German Parliament has rejected, by a large majority of two to one, the bill for im-posing 'compensatory duties' on iron and iron goods. This decision will not fail to influence the negotiations touching the Anglo-French commercial treaty. Reciprocation could be found in the French wine duties. Belgium re-ports 'amall profits and alow returns,' mechports 'small profits and slow returns'—probably 'small by degrees and beautifully less.'

Copper steadier. Australian neglected. Straits

The rather firmer, with moderate business.

Cornwall bemoaning its lot. Tin Plates have given way, both in coke and charcoal, and business is slow. Lead rather dearer. Spanish, desilvered, 221. Spelter unchanged as to quantity delivered and as to values. Quicksilver steady at quotation. Bar silver, price nominal." orts 'small profits and slow returns

Merchant bar Merchant bar, in Wales.... Tin Plates; f. o. b. in Liverpool, per box. Copper: Delivered in Liverpool, per ton.

The Launch of the Saratoga,

On the morning of the 22d a most heartrendng accident occurred at the works of John Roach & Son, in Chester, while the new steamer Saratoga was being launched. It seems that the ship started while the men were splitting away the blocks. Most of them, some forty in number, got out from under the ship's bottom, but some eight or ten at work at the after blocking did not get the word, and as the ship went off seven of them were literally ground to pieces by the flying blocks, timbers and "thrapping chains." Three of the men were wounded, while one who was under the ship's bottom at the time, escaped without injury. The iron steamship Saratoga is a sister ship of the Niagara. Both vessels are for Messrs. James E. Ward & Co., of New York, and are to be employed on the Ward Line between New York and West Indian ports. The dimensions of the Saratoga are 272 feet on the water line. or 292 feet long over all; breadth of beam amidships, 38 feet 1 inch; depth of hold from hurricane deck, 31 feet, and from main deck 28 feet. She is to be of 2400 tons register, and to be able to carry a dead weight of 9000 boxes of sugar. Her propeller, which is to be Hirsch's patent, with movable blades, is to be 14 feet in diameter, to have a pitch of 21 feet, and to make 75 revolutions per minute. She is to have one compound engine of 1650 horsepower, which will be supplied with steam from four large boilers, carrying 80 pounds of steam to the square inch. There will also be donkey engines to run three pumps to clear the bilge and supply the water to the engines. The ship is expected to make 14 nautical miles an hour. The steerage apparatus will be operated by steam, as will also the windiass. The bunkers hold altogether 500 tons of coal. The bunkers in the lower hold have a capacity of 200 tons. She is to be brigantine rigged, and will spread about 2500 yards of canvass, She has five water-tight compartments and three-decks, and accommodations for 60 first-class passengers.

Tidal Waves in the Lakes.

The Cleveland (Ohio) Herald, of the 17th inst., ays: A dispatch from Port Stanley, across the lake, announced that on Tuesday morning a tidal wave five feet high came rushing ashore on Lake Erie, accompanied by a loud hissing noise. The wave lasted but a few minutes, and as quickly receded, followed at intervals for an hour by smaller waves a foot or more high. There was very little wind at the time, and the lake was almost calm. Tidal waves on the lakes are not of uncommon occurrence. Two or three years ago Col. Charles Whittlesey read before the American Association, at Hartford, a paper containing detailed accounts of such tidal waves or "swashes" on this chain of lakes as had been recorded. The first noted on Lake Superior was in 1789, when Alexander Mackenzie saw at the Grand Portage, on the north shore, ooposite Port Royal, a sudden fall of water, equal to four feet, which soon returned with a rush, and continued to vibrate several hours. In 1834 the water above the Sault suddenly fell two and one half feet, and in half an hour came surging back with great velocity. In 1842 the same thing happened below the falls, the current of the river rushing swiftly up stream. Dr. Foster has placed on record that in August, 1845, while in an open boat on Lake Superior, between Copper Harbor and Eagle River, he saw a huge wave, 20 feet high, suddenly rise in the lake about a quarter of a mile distant, which curled over like an immense surge, created with foam, and swept toward the shore, diminishing as it advanced. It passed the voyagers without doing them an injury, and was succeeded by two or three swells. In 1847 and the two following years Dr. Foster observed similar phenomena. A sudden rise of 1 foot 3 inches was observed at Copper Harbor in November, 1851. In July, 1855, there was a succession of rises and falls at the Sault from 9 in the morning to 4 in the afternoon, the maximum of variation being 2 feet 2 inches. At Superior City, on the 22d of September, 1865, there was an oscillation of 50 inches in 15 minutes. On Lake Michigan, Father Andre reported, in 1670, there was on Green Bay a sudden change of 3 feet in the level of the lake, which left his canoe high and dry. In April, 1858, a wave rushed into the river from the lake w th such violence that the ferry-boat on the Menominee was upset. There was a sudden ebb, and in about 20 minutes two larger waves came and receded. The difference in about three-quarters of an hour was full 6 feet. Tidal waves on Lake Erie have been numerous and violent. It is supposed that the loss of Col. Bradstreet's expedition off Rockport, west of Rocky River, in October, 1764, was due to a sudden "swash" similar to one observed at the same place by Mr. Taylor, in 1811, when a white crested wave rushed in from the calm lake and carried a barrel of salt several rods over what had been dry ground into a ravine. DeWitt Clinton reported that on the 10th of May, 1828, at Otter Creek, on the Canada store of Lake Erie, when the water was calm, a wave 9 feet high swept over the beach into the woods and stranded a 35 ton schooner. The same thing oc-

curred at Kettle Creek, 20 miles distant. In the spring of 1830 Mr. Luther Winchell, of Lake county, was fishing with three others at Madison dock, when three large waves came rolling in and swept the party in shore. The first wave was 15 to 20 feet high, and the succeeding ones of diminishing hight. Fourteen years later a wave 15 feet high swept into On the 19th of November, 1845, the water reg- the work for about \$14,000. isters of Col. Stockton, at Cleveland, showed a audden fall of 2 feet 8 inches. In December. 1856, the level of the water at Toledo changed in a few hours 10 feet, first rising 5 feet above the ordinary level and then falling 5 feet. In Amidon Factory at Miller's Falls, and will rethis case, however, the oscillations followed a change in direction of a strong wind. With is to start there for the manufacture of various the last mentioned exception, none of the sudden changes of level were accompanied by or followed strong winds. In nearly every case the sudden rise or fall of water occurred when take out with him an experienced mechanic the air was still, and the lake perfectly caim. In many of the cases, especially those of extreme oscillation, the " swashes" were followed by storms. This fact, which is true of similar oscillations of level in large bodies of water in other parts of the world, suggests a possible explanation of the phenomena. The tidal wave is said to come in from open water parallel to the shore. May it not be caused by sudden atmospheric disturbance or wave, which is local in its extent? This is merely a suggestion, for scientists who have given time and study to the matter commit them-

selves to no definite theory.

Promissory Notes .- There has been no recognized defense to a suit on a promissory note purchased in good faith before maturity, except forgery. Receatly, the Supreme Court payment of a note given by a farmer to a patent-right sharper, thinking it was merely a the Boston Gas Light Company. contract, A bona fide purchaser of the note, before due, brings suit. The Supreme Court (Judge McIlvaine) say: "In an action against iron wire gauze for paper and cotton mills, at the maker, by an indorsee of a negotiable promissory note who purchased the same for a without notice of any fraud or infirmity as between the original parties, the defendant is not liable where it is shown: 1. That at the time of signing and delivering the note he was induced by fraudulent representation as to the character of the paper, to believe that he was signing and delivering an instrument other than a promissory note. 2. That his ignorance of the true character of the paper was not attributable, in whole or in part, to his own negligence in the premises." Another decision in a similar case, delivered at the same time, brings the law down to a finer point. The Court faculties and ability to read signed and delivered | pleted. There are a number of inspectors from a negotiable promissory note, without knowing it to be such, but without reading the same, having and opportunity to do so, relying solely on the representation of the payee that the paper was an instrument other than a note. The Court held: As against a bona fide holder before maturity for value, such maker will not be permitted to deny the due execution of the

The Merchant Fleets of the World,-The Bureau Veritae, of Paris, has recently published its general report of the merchant navies of the world for the years 1876-77. These navies are comprised in 5771 steamers, representing in gross 5,686,342 tons (net tonnage, 3,758,529 tons), and 58,208 sailing vessels, representing a tonnage of 15,533,888 tons. In these figures only sea-going vessels are included. The sailing vessels of the merchant navies of the world are distributed as follows:

STRAIGH OF SHE A OLIVE MIC !		
Plags.	Vessels, Tons.	
Great Britain		
United States	7,238 2,890,52	11
Norway	4,749 1,410,90	13
Italy	4,601 1,292,07	16
Germany	3,456 875,99	15
France		3
Spain	2,915 557.32	0
Greece		KŠ.
Hotland	1,143 399,93	13
Sweden		215
Russia	1,785 391,96	8
Austria	983 \$38,68	14
Denmark	1,348 188,95	88
Portugal		6
South America	273 159,45	8
Central America	153 59,99	14
Turkey		19
Belgium	55 23,34	14
Asia	41 16.01	19
Africa, Liberia	8 42	
Total	58,908 15,553,38	38

A Novelty in Railway Construction -It was until recently the intention of the Boston, Winthrop and Point Shirley Railroad Company to use 40 pound T rails, but after investigation and by indorsement and advice of several of the best railroad engineers it was decided to use 20 pound Angle rais, bolted to substantial wooden stringers, which are placed upon ordinary ties, and by which dangers proceeding from broken rails are avoided, and a large saving made in cost of construction. The contract for the rails and completion of the road has been signed by Albert L. Rice, Esq., president of the Angle Iron Railway Con atraction Company, of Boston. The rails will arrive this week, and track laying will be commenced immediately. We believe the "Angle" rail is named after its inventor, Mr. Angle, of Chicago. The employment of the stringer or sleeper is a novelty in modern railway practice, we think. Formerly sleepers as well as ties were used, and some marked advantages were claimed for at Troy. them over the plan of using cross ties alone. A new form of rail may develop the advantages of sleepers over ties, and give us a new method of construction which shall have the good points of each.

In 1853-54 the estimate for education, science and art in Great Britain was £578,000; this year the estimate reaches £3,546,000.

INDUSTRIAL ITEMS.

annual meeting the directors who were proposing the change, said it would cost about France and Germany. \$40,000. Now the same men who were offering Euclid Creek, carrying everything before it. to contract them at the above figures are doing

MASSACHUSETTS.

Massachusetts has 1144 miles of steel rails. Elijah R. Saxton, a manufacturer at Buffalo, New York, has bought the machinery in the move it to Buffalo and set it up in a factory he small articles in the hardware trade. Mr. Saxton, formerly of Montague, has for years done a large business making car axles. He will from the East to oversee the work-men.

The Boston Rolling Mills, at Cambridgeport, have orders on their books which will keep them busy for at least two months from the present time, and they are receiving additional orders every day. During the very general depression in the iron trade they have been able to give to from 60 to 70 men steady work at Rolling Mill, Newcastle, say they will not start good wages.

The iron ore beds which the Richmond and Stockbridge Iron companies bought of the Leet family 25 or 30 years ago, are excellent property even in these times. The Richmond Company are now working on the right of the farm, and paying the latter a royalty of \$1.50 a

The Chapman Valve Works, Springfield, have received a \$10,000 order from the Pawtucket of Ohio has medified the decisions in this re- (R. I.) Water Works for valves, seven of which gard, in a case coming before it involving the are 24 inch. Baltimore parties have ordered 13 valves, and a large lot has just been shipped to

C. L. Kibbe is manufacturing iron and plated wire sieves of all kinds, and brass, copper and

Belchertown. J. W. Gardner, pocket cutlery manufaturer, valuable consideration before maturity and Sherburne Falls, now employs 56 men and is

crowded with orders. The Howard & Bemis Wire Works, at Leiceser, have doubled their capacity and increased

Sterling & Jessup's Iron Foundry, at Pocas

set, has started up. The works of the New Bedford Copper Co. closed some four weeks since from the breaking down of their engine. They will probably resume work again during the summer

RHODE ISLAND. The Providence Tool Company are making 600 guns a day for the Turks, and have yet "A person possessed of the ordinary 180,000 to make before the contract is com the Turkish government at their works, but they are wholly incompetent to do the work for which they are sent, and the only safe inspection is made by the United States officers detailed by the request of the Turkish govern-ment to pass on the arms. The Turkish inspectors speak neither English Lor French, and know nothing about arms except what they have learned since their arrival here. Mr. Pea body, the inventor of the rifle manufactured, eccives a royalty of \$300 a day.

The American Twist Drill Company, of Woon socket, have received a letter from Kibbenhavn, Denmerk, stating that the company's au tomatic knife grinders, which were shipped last year, have been run steadily and have given great satisfaction. The grinders had been in use several months when the letter was writ-

CONNECTICUT.

At the Farrell Foundry, in Ansonia, they are building the largest sugar mill ever constructed, it is said. It is for a firm in Havana. It took 1614 tons of iron to east one of the rolls.

The pistol manufacturers of Norwich turn out over 14,000 revolvers a month.

The bell of the Iron and Steel Works, at Birmingham, rang on Friday morning the 11th inst., for the purpose of calling some of the men to work. It suggested an alarm of fire, it being so long since it had rung before.

The buildings of the Clark & Cowles Com-

Another cargo of steel rails for the Naugatuck Roa1 arrived Thursday, May 10. Three have now been received.

The Housatonic Railroad Company expect to receive several hundred tons of steel rails this summer, and they will be laid upon the line northward from that point in Newtown where

the work was suspended last year.

They are going to discharge 200 men at the Springfield Armory on account of the lack of an appropriation for their payment.

NEW YORK.

The stove foundry and contents belonging to John H. Quackenbush, West Troy, will be sold by W. S. Kennedy, assignee, for the benefit of the creditors on June 15.

Better times are looked for at Port Henry now. The Bay State Furnace is to go into blast about May 18, after having been idle for 18 months. The Cedar Point Furnace Company have been shipping 200 tons of iron per day for the last six weeks, to the steel works paid shortly .- Reading Eagle.

Work was suspended at the Bessemer Steel Works, at Troy, on the 17th, on account of the \$150,000, was sold recently by the sheriff for breaking of some machinery in the blooming department. Repairs were made at once.

Workmen are engaged removing the machinery from the ruins of Roy's Hinge Factory, at West Troy, recently destroyed by fire.

The Chadborn & Coldwell Manufacturing

works up to 10 o'clock every night in order to meet the demand for their celebrated "Excelsior" lawn mower, of which they are producing Facilities for making steel rails are being put about 300 weekly. More than 5000 have been into the St Albans Rolling Mill. Before the sold this season in this country, and about the same number have been exported to England,

PENNSYLVANIA

The Greenville Rolling Mill, it is reported, will be offered for sale on the 1st of August. It has been appraised by two practical iron men of Sharon-Mr. G. Westerman and Ed. Roberts-at \$49,757.

The iron ore miners along some portions of the East Pennsylvania Railroad are paid but 60 and 70 cents per day of ten hours hard

The Millerstown Iron Company are erecting in engine and ore washery on the land of George Shaffer, the machinery having been removed from Samuel Moyer's farm.

Atkins' Rolling Mill, at Pottsville, received an order for 1000 tons of rails from a North Carolina railroad. The old mill of the Bethlehem Iron Com

pany has received a new order for 1000 tons of iron rails. The managers of Reis, Brown & Berger's up till iron reaches 3 cents per pound. As soon

as it comes to this figure the establishment will

resume operations immediately. A company has been organized in Reading for the manufacture of stoves, furnaces and Company are now working on the right of the beaters, under the name of the "Central Stove Stockbridge Company, on the Nathaniel Leet Company (Limited)," the partners being Messrs. Henry G. Landis, Davis C. Schnader, Thomas F. Hemmick and Elias Fritz.

Scamless steel wheelbarrows are now being made at Harrisburg.

The Warwick Furnace is again in blast. The Stony Creek Rolling Mill, Norristown, was sold to James Beyrom, of Belleville, Ill. The mill is to be removed to Centralia, that State, the people there having subscribed

\$50,000 to the stock. It is reported that the Pennsylvania Iron Works, Danville, will be put in operation at

One of the Henry Clay Furnaces of Eckert & Bro., in Reading, has gone into blast after having been idle for months.

Work at Bailey's puddling mills, Harrisburg has been resumed. Fourteen furnaces are in full blast on double turn, and the production is now equal to any which has been piled up since the mills were first started. In the plate mill double turns are also made, with three furnaces in full operation. In the nail mill the running is all during the day, in full hand.

Greenwood Furnace, in Huntingdon county was expecting to go in blast about the 15th or 20th of this month

An 8 foot vein of coal has been discovered near Susquehanna Station, in Su-quehanna county, on the line of the Eric Railroad.

A report prevailed in the business centers of Reading on the 19th that there was trouble apprehended among the employes of Seyfert, McManus & Co., at the rolling and pipe mill. and also at the Scott Works. The matter was inquired fato, and to some extent the report was found to be correct, for the fact that very nearly three months' wages are due the men, and they say they are beginning to feel the want of money. They are expecting pay every day, and a number of the employes in various departments have signified their intention of going on a strike if they are not paid. A preliminary meeting was held last evening, it is reported, for the purpose of taking these matters into consideration, and it is rumored that if the men are not paid a large number will quit on Monday. The last pay the men had at the mill was made some six weeks ago, and then the tands were paid for work done in February. It is the custom of the firm to keep one month's wages back. That is, a man must work two months before he receives his wages for the first month. Seyfert, McManus & Co. owe their hands for March, April and thus far in May, and it is on this account that the hands base their disaffection. Inquiry was made at the Reading office of the corporation yesterday. The superintendent, Captain McManus, was not at home. Mr. Horatio Trexler, Sr., was consulted, and that gentleman said he knew pany, manufacturers of light bardware, in nothing of any impending trouble, and so far Piainville, were burned on Friday, the 11th, a as he knew no trouble was apprehended. He little after midnight. The cause of the fire is had heard nothing of the report concerning unknown. The lose is \$25,000, and the in- any disaffection, and could say nothing about it. With regard to money matters, he said that to skip a pay day was unavoidable sometimes, but whether the last non-payment of monthly wages was going to cause a strike or any other trouble he could not state. The works are very busy, and large quantities of iron are being shipped. Inquiry was next made at a neighbor ing grocery store, with a view of ascertaining how the men managed to make ends meet. Mr. Edward Jackson, of Jackson's Locks, said that he had some 21 mill men as his regular customers, but they could get on credit whatever they desired if they had not the money. "Still," said Mr. Jackson, "that don't aid us in paying for our bills. We cannot carry on business in that manner too long. But I know that when my customers get their money I will get mine. The hands are expecting their pay every day." Several customers were observed buying gro ceries and provisions on the book credit system. It is expected that the impending trouble will quietly pass away, and that the hands will be

> The East Penn Iron Company's property, in Berks county, which is said to be worth

A gas pipe manufactory is being erected at Newcastle, near the establishment of the Newcastle Manufacturing Company.

Charles W. Ervien & Co., Philadelphia, steam

count, and they are this week sending one to California

The Baldwin Locomotive Works, Philadelphia, have just shipped a remarkably fine locomotive to Australia. This is to fill a sample order sent by the government of that country. They have also a similar order from the govern ment of New Zealand.

The United States Automatic Stoker Company, No. 2 Chestnut street, Philadelphia (Dillwyn Smith's patent), are rapidly extending their business. They have quite a number of stokers in use in the United States, and have eleven now in course of construction-five for use in Philadelphia, one for Jewett & Root, of Buffalo, and others for different sections of the ountry. These machines appear to give even better results than the patentee claimed for them, and will doubtless be widely adopted by large consumers of steam.

PITTSBURGH AND VICINITY

The Scottdale mills are running full. The blast furnace of Graff, Bennett & Co. is again in blast, the place of the strikers having been supplied with new men at the old

The following are some of the business returns of Allegheny City for the past year: Lewis, Dalzell & Co., \$381,620; Spang, Chalfant & Co., \$325,000; Pittsburgh Forge and Iron Co., \$289,870; Smith, Sutton & Co., \$260,000; Lewis, Oliver & Phillips (only one mill, the other is in Pittsburgh), \$250,000; Lindsay & McCutcheon, \$125,000; Pittsburgh Locomotive Works, \$125,000; Samuel Reynolds & Co., \$100,000.

The Dunbar Furnace is making 500 tons per week on one-tenth Lake and the balance native

The Globe Plow Works have recently sent two large lots of plows to Cape Colony. They have regular customers in South America and in Germany.

The Jacobus & Nimick Manufacturing Company, of Pittsburgh, are sending their new bronze ware to California.

W. D. Wood & Co. have received a sample order from England for locomotive jacket iron, the party ordering having seen their iron on the locomotives in the Centennial Exhibition.

The Amalgamated Association of Iron and Steel Workers of this district met on the afternoon of Saturday, the 9th, in the hall of Iron

About all the material with which the new Point bridge was constructed was furnished by manufacturers of this city.

MARYLAND.

The Altoona Rolling Mill, of Western Maryland, has resumed operations, employing a large number of hands.

WEST VIRGINIA.

The Wheeling Standard says six new furnaces for the Upper Riverside Mill are contemplated, which will give that branch of the mill 40 in all. Glass houses and hinge factory all report plenty of orders and good prospects.

OHIO. The Southern Cotton Tie Company, with nain office at Youngstown, and with branch office at Cleveland, capital stock \$25,000, in shares of \$50 each, has been incorporated by James Cartwright and others.

The Girard Rolling Mill has been sold to Evan Morris for \$24,000.

The Enterprise Mill, Youngstown, is running to its full capacity. The Mill Creek Mill is now

tors will be in no hurry.

Work at H. Campbell & Sons' new furnace, fronton, is progressing rapidly. The stone foundation is down for the casting and boiler house, and the masons are now busy at the foundation of the stack. The bad weather has seriously interfered with brick makers, but they will have a kiln ready by the middle of June. The requisite costings have been begun, and in a very short time the sheet from work will be under headway. The furnace could be completed this year, but the proprie-

The Iron and Steel Company's Mili, Irontor, has stopped and will not start again before next Angust. The furnace is still in blast.

The Burgess Steel and Iron Works, Portsnouth, which were idle a short time, resumed operations last week with a reduced force.

ALABAMA. The Alabama Furnace has a very large stock

of fuel and ores on hand ready for immediate resumption. The blast was to have been begun the latter part of last week. GEORGIA.

Stonewall Furnace has blown out to put in a

The Rogers Iron Company offer their furnace property for sale at \$40,000. TENNESSEE. Mr. McNeal is making extensive preparations for the new furnace he is to build at Chatta

nooga. It will probably be a duplicate in style.

size and capacity of the two furnaces now be ing erected at South Pittsburgh. Mr. McNeal proposes to give bonds to make standard metal

at \$12 per ton. The Southern States Coal, Iron and Land Company, South Pittsburgh, have just received seven car loads of castings via Port Royal, from England, for the Whitwell hot blast oven. Work is progressing rapidly upon the two large stacks, and a hope is expressed that by Jan. 1, 1878, they will both be in blast.

KENTUCKY. The Louisville Mill has shut down for re-

Hillman's Plate Mill has been running or

some very heavy orders for California. One of the boilers at Princess Furnace exploded Monday, the 14th. The boiler parted near the middle; one half was forced against the Whitwell oven, which was damaged, and then glanced off against the down-comer, tearengine makers, appear to have a steadily in- ing that considerably, beside doing other in-Company, of Newburg, are running their large creasing business. Their engines have recently juries; the other half flew off some 60 yards.

been sold to several parties for European ac- The other two bollers in the battery were displaced and damaged, but they can be easily restored. The boller that exploded was an old one that had been in use for some years. No person was hurt. The Princess is a new furnace near Buena Vista, Boyd county, owned by Culbertson, Means & Co., and has been in oper ation only a few months.

MISSOURI.

Evens & Howard made and shipped 13,000 ons of fire clay manufactures last year. The Laclede Rolling Mills, St. Louis, are run-

ning double turn and employing 425 men. The Harrison Wire Works, St. Louis, are

employing 250 hands and running double turn. The St. Louis Bolt and Iron Company are driven to fill orders for steel fish plates, etc., made from Bessemer steel.

ILLINOIS.

The Jollet Steel Works have suspended operations on account of a breakage. While rolling a rail the other morning the latter part of the right shaft—the fly-wheel shaft—broke It was of cast iron. It will be replaced with a wrought iron one. Probably it will take three or four weeks to repair the damage. The company are busily engaged in altering the iron rail mill to manufacture railroad spikes, fish plates and wire.

The late employes of the nail mill at Ohio City are leaving the town in large numbers, having accepted other employment in despair of the early starting of the mill.

The force in the railroad car shops at Zaleski has been reduced by 81 men, and the rest have been put on eight hours' time.

MICHIGAN.

The following are said to be the prices for sheet rolling at Wyandotte: From 15 to 17 gauge, \$5.50 per ton; from 18 to 21 gauge, \$7.05 per ton; from 22 to 24 gauge, \$7.50; from 25 to 27 gauge, \$8:50; from 28 to 30 gauge, \$10.

A stock company with \$25,000 capital, called the Combination Lock Works, has recently been formed at Bay City, to manufacture Foxe's patent combination locks, consisting of a full line of door, cabinet, trunk and padlocks-52 different kinds.

The merchant mill, at Wyandotte, is being supplied with new roll gearing, the old having broken down last week for the tenth time in four months. A 12 ton fly-wheel will also be set up in place of the present 9 ton one, which has never been heavy enough. The Detroit Stove Works have just shipped

number of cook stoves to Melbourne, Australia. This is the second Australian order filled by the firm within the last 13 months. The new merchant mill of the Baugh Steam

Forge Company, Detroi , will be ready for business about the first of June.

The Pacific Iron Works, Sau Francisco, employ from 300 to 400 hands, and produce castings, machinery, boilers, &c., to the value of nearly \$1,000,000 annually. It is one of the oldest manufacturing institutions in the city, having been established in 1851.

Saw-Makers' Excursion .- On Saturday ast Messrs. Henry Disston & Sons, of Philadelphia, treated their employes, together with their wives and children, to a holiday and an excursion to Tacony. The day was fine, and about 1500 persons availed themselves of Messrs. Disston's hospitality. A substantial lunch, music, dancing and field sports combined to make a day of healthy enjoyment which will not soon be forgotten by the participants.

The Federal Statistical Bureau of Switzerland shows, through an elaborate volume recently published, that in 1875 the country had forty-six scientific societies, the membership of which amounted to 54,424. The societies for educa-tional purposes numbered 816, with 54,424 members.

London Metal Market.

Ple own f. o. b. Clyde 2	8.	d. 3	£.	8.	d.
Pig, 6MB, f. o. b., Clyde 2 "Scotch, all No. 1 2 Bars, Weish, f. e. b. Wales. 5 " in London 6	15	6	3	5	6
Bars, Weish, f. o. D. Wales. 5	15	0	6	0	0
" Staff'd in London 7	15	0	8	15	6
" in Type or Tees \$	0	0	6	8	0
in Type or Tees 6 Swedish, London 10	0	0	10	10	0
	0	0	9	9	0
Railway Chairs	-		-	_	
Sheets, Staff., in London 9	10	9	9	5	0
Plates, ship., in London 7 Hoops, Staff	15	0	8	15	0
Nail Rods, Stan'd in L'ndon	10	0	7	15	0
English, spring 14	0		28	0	0
Ditto cast 25	0	0	45	0	0
Swedish, keg	10	0	-		
Lend		-			
English Pig. common 21	10	0	-		
Ditto, LB	10	0	_		
Ditto, Sheet and Bar 22	0	0	53	5	
Ditto, Pipe 24	10.	0	_		
English Pig. common. 21	. 5	ě	28	0	
Ditto. Patent Shot 24	10		-		
Spanish	5	0	_		
	5	0	-		
Spelter. Sflesian or Rhenish 20	5	0	20	7	6
	10	0	-		_
Sheet Zinc 34	0	0	25	0	0
Tiu. English ingot, f. o. b 74	6	0	_		
Ditto Bare	0	0	-		
Ditto Refined 77 Australian 69	15	0	70	0	0
Banca 71	10	0	13	0	0
Straits 70	10	0	71	0	0
Copper Tough Cake & Ingot 75 Best Selected 76	0	0	76	0	0
Best Selected 76	0	0	77	10	U
Sheets and Sheathing 81	0	9	85	0	0
Wallaroo	0	0	_		
Burra, or P.C.C 75	0	0.	75		0
Chili bars, g. o b	ŏ	0	-		
Flat Bottoms 84 Wallaroo 96 Burra, or P.C.C. 75 Other brands 74 Chili bars, g. o b 69 Pbespher Brenze. Bearing Metsl 112 Other Alloys 129		0			
Other Alloys	0	0	140	0	0
Brass.					
Wire 6	0	10	_		
	0	19	-		794/
Yel. Met. Sheath. & Sheets. O	0	8%	0	0	94
Tim thates—B box.		0.8			
Nalis composition	2	- 6	1	3	6
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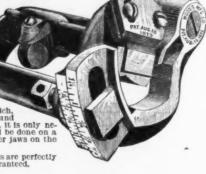
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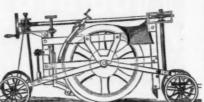
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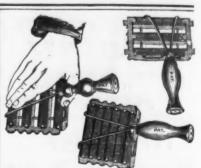
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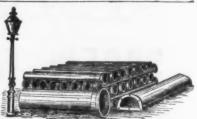
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	Shipley A. D. & Son, Philadelphia	0
l	Bac.er. Adamson & Co. 790 Market Phile 99	3
	Fluting Machines, Sauerbier's Sons, H., Newark N. J. 28 The American Machine Co., Philadelphia. 17	B
1	Loring Abbott & Co., 6 Central, Boston, Mass. 3	n
1	Forges. Portable, etc. Keystone Portable Forge Co., Philadelphia40 Founders and Machinists.	0
-	Samil. J. Cresswell Jr., 812 Race, Phila., Pa	1
	Reystone Portable Forge Co. Philadelphia. 40 Founders and Machinisms. Sami. J. Cresswell Jr. 812 Race. Phila. Pa 6 Founder Vactures. Paxson J. W. & Co. 514 Beach. Phila. 5 Whitehead Bros. 317 W. 15th. N. Y. 4 Furnaces. Makers or Richmond & Potts. 119 S. Fourth, Phila., Pa 5 Gaivanized Iron. Lefterts Marshall Jr. 90 Beekman, N. Y. 4 Gas Fitters' Supplies. Prentiss H. & Co., 14 Dey, N. Y. 18 Glass Signs.	
	Gaivanized Iron . Lefterts Marshall Jr. 90 Beekman, N. Y	1
l	Prentiss H. & Co., 14 Dey, N. Y	1
	Governors. Junius Judson & Son. Rochester, N. T	10
	Junius Judson & Son. Rochester, N. Y	1
l	Wood Walter R., 283 and 285 Front, N. Y	I
١	Moore's John P. Sons, 900 Broadway, N. Y 6	1
l	Kneeland F. L. (Dupont) 70 Wall, N. Y	1
I	Guipowder, Makersof. Guipowder, Makersof. Kneeland F. L. (Dupont 70 Wall, N. Y	1,
١	N. Carolina Handie Co., 79 Reade, N. T	1
l	Biglin Philip S., 1/0 Chambers, N. Y	1
	Handley R. H., Augusta, Mc	
١	Lioyd. Supplee & Walton. 625 Market. Phila	1
1	Shepara Sidney & Co., Buffalo N. Y. Bardware Importers. Boker Hermann & Co., 101 Dance N. V.	1
١	King, Bitags & Co., 80 Chambers N. Y	1
١	Windmuler Louis & Boelker 30 Reade N. Y	1
١	Blake Bros. Hardware Co., New flaven, Cons	
1	Corbin P. & F. New Britain, Conn. Cowles Hardware Co., Unionville, Ut	
	Miller's Falls Mfg. Co., 74 Chambers, N. Y	1
	Pratt & Co., Buffalo, N. Y	
	Union Mfg. Co. 99 Chambers, N. Y	
	Hardware Specialties. Grant & Co., Newark, N. J. Jessup & Sterling, 7 and 9 CHg. N. Y.	
	Quackenpush. Townsend & Co., #9 Iseade. N Y. 98 Shepars Sidner & Co., Buffalo N. Y. 98 Shepars Sidner & Co., Buffalo N. Y. 98 Boker Hermann & Co., 101 Duane. N. Y. 95 King, Bitgs & Co., 80 Chambers N. Y. 11 Van wart, 80n & Co., 134 and 136 Duane. N. Y. 11 Wan wart, 80n & Co., 134 and 136 Duane. N. Y. 11 Wandmuller Louis & Roelker 30 Reade N. Y. 11 Windmuller Louis & Roelker 30 Reade N. Y. 11 Windmuller Louis & Roelker 30 Reade N. Y. 11 Windmuller Louis & Roelker 30 Reade N. Y. 20 Hardware Winnufacturers. American Solral Spring Buit Co., 82 Beekman, N. Y. 42 Blake Bros. Hardware Co., New Haven, Conn. 30 Clurk & Co., Buffalo, N. Y. 36 Corbin P. & F. New Britain, Conn. Cowles Hardware Co., Unioville, U. 17 Enterprise Mig. Co., Co., 14 Chambers N. Y. 25 Willer Salis Mig. Co., 14 Chambers N. Y. 25 Pecia Gaff Mig. Co., Chambers, N. Y. 18 Providence Tool Co., Providence. R. 1 Union Mig. Co. 30 Chambers, N. Y. 19 Union Mig. Co., New York 11 Union Mig. Co., New York 11 Union Mig. Co., New London, Coon. 62 Wilson Mig. Co., New London, Coon. 62 Hardware Specifalies. Grant & Co., Newark, N. J. 35 Jessup & Sterius, 7 and 9 Cliff, N. Y. 46 Perin & Gaff Mig. Co., Stephen Sterius, 7 and 9 Cliff, N. Y. 46 Perin & Gaff Mig. Co., Chemanati, O. 68 Semple & Birge Mig. Co., St. Louis, Mo. 44 Snepard Sidney & Co., Buffalo, N. Y. 33 Spencer & Underhill, 31 Chambers, N. Y. 34 Signer & Underhill, 31 Chambers, M. Y. 35 Lewis, Oliver & Phillips, Pittaburgh, Pa. 15	
	Spencer & Underhill, 94 Chambers, N. Y	1
	Crane Bros. Mfg. Co. Chicago, 111	
1	Mundy J. S., Newark, N. J	
1	National Horse Nail Co., Vergennes, Vt 22 Northwestern horse Nail Co., Chicago, Ill. 35	
-	Horse Naile, Makers of Ausable Horse Nail Co. 35 Chambers, N. Y. Globe Nail Co. Boston, Mass. National Horse Nail Co. Vergennes, Vt. 22 Northwestern Horse Nail Co., Chicago, Ill. 35 Patt & Co. Buffalo, N. Y. Jutnam S. & Co. A-bonnest, Mass. The Fowler Nail Co., Seymour, Conn. 35 Horse Shees, Makers of. 38	5
-	The Fowler Nail Co., Seymour, Conn. 3. Horse Shees, McKersof. Boston Rolling Mills, 17 Besterymarch, Boston Burden Iron Works. Troy. N. 17 Khode Island Horse Shee Co., Providence, K. I., 12 Schoenberger & Co., Fittsburgh, Ps.	1
1	Schoenberger & Co., Pittsburgh, Pa	
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1	Lyon E. & Co., 45 Grand, N. Y les Creum Freezers. Packer Charles W., Philadeiphia.	1
2000	Heatford Steam Boller Inspection and Insurance Co. 4	1
9	Hart Orders Section and Indurance Co.4 Iron Brokers. Boynton Geo. A. 70 Wall, N. Y. Crane U. O., 101 John, N. Y. Hatry A. G., Pitisburgh, Pa. Hazard T. D. 204 Pearl, N. Y. Iron Hitagres. Iron Bridge and Iron Works, Mochanta, N. S.	
8	Hazard T. D. 204 Pearl, N. Y. Iron Buidges. Leighton Bridge and Iron Works, Rochester, N. Y. 2	6
-	Iron (Castings.) Spencer's Sons, I. S., Gullford, Conn	8
-	Quincy John W., 98 William. N. Y., Iron Commission Merchants, Adam Hugh W., 56 Pine, N. Y.	1
2	Leighton Bridge and Iron Works. Rochester, N. Y. 2: Iron (Castings.) Spencer's Sons. I. S Gullford. Conn. Iron. Charcon!, Warm or Old Elast. Quincy John W. 38 William. N. Y. Iron Commission Merchants. Adams Hugh Merchants. Adams Hugh Rechants. Adams Hugh Rech	5 5
	Iron. Pig, Importers of. Williamson James & Co. 69 Wall, N. Y.	
1	Abeel Brothers, 190 South, N. T. Bonnell, Botsford & Co., Youngstown, O	4
-	Cooney Daniel F, 88 Wasnington, N. Y. Huerstel G. 99 Market Slip, N. Y.	4
700	Harrison & Chase, 206 and 208 Franklin, N. Y. Jackson & Chase, 206 and 208 Franklin, N. Y.	
8	Judson B F . 40; and 459 Water, N. Y. Moore tree, S. & Co., Louisville, Ky. Oggen Wallace, 35, 57.59 and 91 Elm, N. Y.	4
1	Fierson & Co., 24 Broadway, N. Y. Quincy John W., 26 Wullam, N. Y. Randall & Jones (Taylor Iron), 10 Oliver, Boston.	4
87	Muss Reed John H. & Co. Bicnards D. W & Co., 92 Mangin St. N. V	4
0 0	Wallace Wm. H. & Co., Albany and Washington atreets, N. Y. Warner A. B. & Sons. 28 and 29 West, N. V.	4
0	Williamson James & Co., 69 Wall, N. Y. Whitney A. R. & Bro., 56 Hudson N. Y. Irou, Manufacturers or,	4
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7 9	Iren. Pig. Importers of. Williamson James & Co. 69 Wall. N. Y. Iren Pealers. Abeel Brothers, 190 South. N. Y. Bonnell, Botsford & Co., Youngstown, O. Borden & Lovell, 79 and il West, N. Y. Cooney Daniel F. 88 Wasnington, N. Y. Huerstel G. & Co. 198 Greenwich, N. Y. Huerstel G. & Collison, 58 to 962 Water, N. Y. Puller, Low Gillson, 58 to 962 Water, N. Y. Jackson & Gillson, 58 to 962 Water, N. Y. Jackson & Gillson, 58 to 962 Water, N. Y. Judson B. F. 45; and 459 Water, N. Y. Judson B. F. 45; and 469 Water, N. Y. Judson B. F. 45; and 480 Water, N. Y. Pierson & Co., 24 Broadway, N. Y. Onincy John W. S. William, N. Y. Pierson & Co., 25 Mangun St. N., Y. Wallace W. S. William, N. Y. Wallace W. H. & Co., 26 Mangun St. N. V. Williamson James & Co., 69 Wall, N. Y. Williamson James & Co., 69 Wall, N. Y. Williamson James & Co., 69 Wall, N. Y. Williamson James & Co., 69 Mall, N. Y. Burden Freis & Co., 22 Cliff, N. Y. Clevetand Rolling Mills, 17 Batterymarch, Boston Bradler, Reis & Co., 22 Cliff, N. Y. Clevetand Rolling Mill Co., (Leveland, O. Everson, Macrum & Co., Pittsourgn, Ps. J. & J. Rogera Iron Co., Ausable Forks, N. Y. Leonard John, 49 & 461 West st. N. Y. Oxford Fron Co., 38 Mallable Forks, N. Y.	6
9 7	J. & J. Rogers Iron Co., Ausable Forks, N. Y. Leonard John, 450 & 451 West st., N. Y. Oxford Iron Co., St. Washington, N. Y.	4

7	HE IRON AGE	٥.
1	ron, Planished Sheet Manufacturers of Wood W. D. & Co., Pittsburgh, Ps	Sa de Osli Sa ne Bac
1	Tatham & Bros., 52 Beekman, N. Y	Sasi Bat Baw Am
1	Mitander Nils, 49 William, N. Y. Fronware (Granite.) St. Louis Stamping Co., St. Louis, Mo	Ati Boy Dus
	Japans (Copal.) Moller & Schumann, Marcy & Flushing Avenues, Brooklyn, N. V	Wh N Saw Pes
ľ	Lanterns, Manufacturers of. Dietz R. K., (Tubular) 54 and 56 Fulton, N. Y	Beal En Cha Rie
1	Lawn Sprioklers. Walworth Mfg. Co., Boston, Mass. 9 Lean Pipo. &cc., Manyacturers of. Bavley, Farreli & Co., Pittsburgh, Pa. 2	Mil Ru
	Levels. Disston Henry & Sons, Phila	Sere Bri Sere Die
	Bohannan Wilson, Broadway and Kossuth, Brooklyn, F. D. 19 F. D. 19 Romer & Co., Newark, N. J. 19 United States Lock Co., King-ton, Mass. 36 Vale Lock Mfg. Co., 298 Broadway, N. Y. 17 Mackburst 17	Sere Tro Seyt
	Yale Lock Mfg. Co 298 Broadway, N. Y	Sha Wo Sho Ru
	Machinery, Makera or. Bliss & Williams, 187 Plymouth, Brooklyv. Bliss & Williams, 187 Plymouth, Pa. 41 Pratt & Whitney Co., Hartford, Cong. 40 Sellers Wm, & Co., 1800 Hamilton Phila. 44 Teat, C. A. & W. L., 416 Luolow, Phila., Pa. 25 The Bullard Machine Co., 14 Dey, N. Y. 20 Wetnerill Kobert & Co., Chester, Pa. 40	Mic Old Re Sho
1	Machine Screws, Makers or, Lyon & Fellows Mg. Co., Williamsburg, N. Y	She Ma She
1	Leng & Ogden, 212 Pearl, N. Y	Shu We Siev Da
	Malleable Iron Custings. Maker of. 44 Hammer & Co., Branford. Ct	Ska Flo Slei Cro Smo
	Eddy Geom. & Co., 358 Classon Ave., Brooklyn, N. Y 6	Ho Re
	N. Y. Haudie & Mallet Works, 456 E. Houston23 Manganese. Pyrolusite Manganese Co., 214 Pearl, N. Y34 Manutes	Spe Mi Spe Sh
-	Standard Launden Mach Co Destroy & M	Mm P
	Ment Chapping Machinery. Murray Iron Works, Burlington, Iowa. Silvetai Dealers and Breskers. Crane C. O. 104 John. N. Y. Dickerson, Van Dusen & Co. 23 & Si Cliff, N. Y. 2 Gregg H Co. Cliff, beth. Cliff, beth. Silvets Common	Sta Cr Ste Br
	Purves A. & Son, cor. South and Pean, Phila. 5 Quincy J. W. 18 William, N. 7. 27 Seilew R. & Co., St. Louis Mo. 2 Metallurgists. 2	Ste Ca Ci
	Sellew R. & Co., St. Louis Mo. 2	Mi Vi
-	James Boyd's Sons, 10 and 12 Franklin, N. Y 18	Jo Ste Bi Cr F
	Models. Lennox & Paine, Cleveland, O. 8 Molding Machines. Hammer T. F., Branford, Conn. Hammer T. F., Branford, Conn. Dietz B. E. Branford, Conn. Dietz B. E. Branford, Conn. Mowling Machine Knife Grinder. Fisher Henry, Canton, O. 82 Naiis	Bte.
		Ho Jo
	Nail Machinery. Coyna & Hatry, Pittaburgh, Pa. Mail Paliers. Malthy, Curtiss & Co., 34 Reade, N. Y.	Ste Ste Ru Ste
	Nickel Pinters. Carle: Edward, Troy, N. Y	CI CI M
-	Schoenberger & Co., Pittsburgh, Pa. 4 Zug & Co., Pittsburgh, Pa. 4 Nail Machinery. Coyne & Hatry, Pittsburgh, Pa. 4 Nail Pailers. Maitty, Curtiss & Co., 34 Reade, N. Y. 6 Nickel Pinters. Carter Edward, Troy, N. Y. 27 Cott A. T. 44 Beckman, N. Y. 27 Condit, Hanton & Van Winkle, Newark, N. J. 27 Hattman John, 374 N. Seventh, Philadelphia. 27 Manhactan Nickel Works, 189 and 182 Center, N. Y. 37 Menshan J., Franklit, opposite tombe, N. Y. 27 Owen S. S. & Co., 121 E. 18, N. Y. 32 Norway Shapen, Rollers of, Rowland Man, & Harvey, Frankford, Phila. 43 Notary Public. 450 August Phila. 45	M N Re Si
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	Gallauget P. W 3 and 5 Wall, N. Y. Nuts. Botts. etc., Nakers of, Cark 3ros. & Co., Middel, Conn. Fuller, Lord & Co., 189 dreenwich, N. Y. Haskell W. H. & Co., Pawtucket, R. I. Lewis, Oliver & Phillips, Pittaburgh, Ps. II Russell, Birdsall & Ward, Port Chester, N. Y. Shelton Co., Birmingham, Conn. Union Nut Co., 78 Beekman N. Y. 611 Cosk Staves.	Ste
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5	Packing ("team). Symonds & Co., Philadelphia. Paint (Ivon). Paint (Ivon). Pithough Iron Paint Co., Pittsburgh, Pa	Ta
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98	Reger W. R., Philadelphia	Tu H
5 5 1 8	McNab & Harlin Mig. Co 56 John. N. Y. 2 Pancoast & Maule. 27 Pear. Phila. 2 Pipe. Water and Gras, Makers of. Leighton Bridge and Iron Works, Rochester, N. Y. 2	6 Tw
4 4 2	Marrea Foundry & Macn. Co., N. J. Warrea Foundry & Macn. Co., Phillipsburg, N. J	6 VA
3	D. R. Barton Tool Co., Rochester, N. Y. Planes. Manufacturer of D. R. Berton Tool Co., Rochester, N. Y. Stanley Rule & Level Co., 35 Chambers, N. I. Plated Ware Derby Silver Co., Derby. Ct. Hall, Elton & Co., 75 Chambers, N. Y. 1 Play 8.	S VI
6.	Derby Silver Co Derby. ct	V V V V
1 4 4 4	Plows, Rones J. & S. & Co., Rome, Gs	W A
4 3 2	Eureka Digger Co., 84 William, N. Y	6 W
4	Bliss & Williams, 167 Plymouth, Brooklyn	W W
5544	Penneid Biock Works, Lockport, N. Y	B C J
4 4 4	Bider, Wooster & Co., Walden, Orange Co., N. Y 3 Pumps, Makers of. Douglas W. & B., Middletown Conn	7 W
44444	Rider, Woosier & Co., Walden, Orange Co., N. Y 3 Rumsey & Co., Seneca Faila, N. Y. Union Mrg. Co., 98 Chambers, N. Y. Pyrometers.	2 6 7 7 7 1 1 1 1 1 1 1
44444	Union Mfg. Co., 98 Chambers, N. Y. Pyrometers. Brown Edward, 511 Wainut, Phila. 8 Raitread Supplies. Jackson & Tyier Baitlmore, Md. 1 Eogers H. A. 19-John, N. T. 1 Akins Bros., Pottsville, Ps. Cambris Iron Co., Johnstown, Ps. Cleveland Bolling Mill Co., Cleveland, O. The Edgar Thomson Steel Co., 57 Brosdway, N. Y., 8 Wood & Leman, 3: Wall, N. Y. Razer Straps, Mokers of, B. F. Badget & Son. Challestown, Mass. Refrigerators.	8 7 8 7 9 W
464	Atkins Bros., Pottaville, Pa. Cambria Iron Co., Johnstown, Pa. Cleveland Rolling Mill Co., Cleveland, O. The Edgar Thomson Steel Co., 57 Brosdway, N. Y., 8 Wood & Leman, St. Wall N.	5 W
4444	wood & Leman, S: Wall, N. Y Razer Straps, McKers or, B. F. Badget & Son. Challestown. Mass. Refrigerators. Law William. 729 & 731 Third Ave., N. Y	8 0
2444	Gilmor Wm. of Wm., Baltimore, Md	2 W
64444	Townsend W. P. & Co., Pittsburgh, Pa. Rond Rollers. Floner Iron Works, 149 William, Brooklyn, N. Y 8 Rond Scrapers, &c., Semple & Birke Mr. (c., St. Lond. Mr.	W
2546	Heiling Mili Machinery, etc., Manuacturer of Moore ames, Cor 16th and Buttonwood, Phila. Reserv Shears. Newbold R. S. & Son, Norristown, Pa	1 W
134544	Townsend w. S. & Co., Pittsburgh, Ps. Rend & ellers. Rend & ellers. Ronal Scalers. Ronal Ronal Scalers. Ronal Ron	8 W

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5	Saddlers' Tools. Osborne C. S. & Co., Newark, N. J	4
.	Sash Fasteners.	
. 4	Sa.ws. Makers of. American Saw Co., Trenton, N. J	
.38	Baues, Makers of, American Saw Co., Trenton, N. J	8
41	Wheeler. Madden & Clemson Mfg. Co., Middletown. N. Y	0
.37	Man Ing Manufasiumen or	
. 40	Francion Mfg. Co., Brandon, Vt	
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. 29 vn.	Screws, Importers of. Bruce Geo. W., I Platt, N. Y. Screw Brivers, (Improved) Makers of. Disston Heavy & Sons, Phila	
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.41 .88 .20	Middleboro Shovel Co. 63 Oliver, Boston	,
.12	Sparks Thos. W., 12t Walnut, Philadelphis	1
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2	Bradley Mfg. Co., Syracuse, N. Y	
5	Clayton Jas., 11 Water, Brooklyn, N. Y. 8 Crane Bros. Mrg. Co. Unicago, III. 28 Rnowles Steam Frame Works Warren Mass. 40	
2	McGowan John H. & Co., Cincilpati, O	
28	Albany Steam Trap Co., Albany, N. Y	
8	McGowan John R. & Co., Chickbart, O. 41 Valley Machine Co., East Hampton, Mass. 41 Steam Trans. 40 Jones A. L., Philadelph a. 40 Jones A. L., Philadelph a. 40 Jones A. L., Philadelph a. 42 Chester Casting a., Montracturers of 42 Chester Casting Co. Evelba. Phila Ps. 42 Placy Stanley G. & Co., 216 & 218 N. 3rd, Phila. 42 Pitaburgh Steel Casting Co., Pittab 17gh, Pa. 42 Pitaburgh Steel Casting Co., Pitab 17gh, Pa. 42 Pitaburgh Steel Casting Co., Pittab 17gh, Pa. 42 Pitaburgh Steel Casting Co., Pitab 17gh, Pa. 42 Pitaburgh S	
. 42	Steel importers. Car J. & Riley, 82 John, N. Y	
32	Hobson Francis & Son, 37 John, N. Y	
:: 4	Ricel Importers. Car J. & Riley, 22 John, N. Y. Car J. & Riley, 22 John, N. Y. Car J. & Riley, 23 John, N. Y. Car J. & Riley, 24 John, N. Y. Johns, Meyer & Colver, Hartford, Cohn. 4 Johns, Meyer & Colver, Hartford, Cohn. 4 Picrsons & Co. 24 Broadway, N. Y. Sanderson Geo. & Co. 57 John, N. Y. Van Wart, Son & Co. 134 and 135 Duane, N. Y. 11 Steel (Mushet Special).	
6	The daily of Tanana to Olivera Product Marie Marie	١
27	Chrome Steel Co., Brookivn, E. D	I
27	Milie: Metcalf & Paikin, Pittsburgn. 34 Nicholson John & Sons, Sheffield, England. 34 Rowlane Wm. & Harvey, Franktord Phila. 42	١
42	Marvale Steel Works, Micetown, Phila, Pa. 34 Mitter. Metcalf & Parkin, Pittsburgn. 34 Nicholson John & Sons, Sheffield, England. 34 Rowlano Wm. & Barvey, Frankford Phila. 42 Smith, Sutton & Co., Pittsburgn, Pa. 34 Singer, Simuck & Co., Pittsburgh, 19 Sweet's Mig Co., Syracuse, N. Y. 34 The Edgar Thomson Steel Co., 57 Broadway, N. Y. 36 Wardlow S. & C., Sheffield, England. 34	
4	Clark & Co 's 161 & 164 W 97th W V	١
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13	Stone Ironware. Metal Mgs. Co., St. Louis, Mo	
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25	Junius Judson & Son, Rochester, N. Y	8
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33	Lewis John T. & Bros., 281 S. Front, Phila., Pa 28	6
82	Hammond W. S., Lewisberry, Pa. Wire, Manufacturers of, Cary & Moen, 234 W. 29th, N. Y.	,
3	Gilbert & Bennett Mfg, Co., 273 Pearl, N. Y	-
25	Townsend W. P. & Co., Pittspurgh, Pa. Washburn & Moen Mfg. Co., Worcester, Mass Trenton Iron Co., Trenton N	10000
(Wire Cleth. Irvine A. A., 14 Murray, N. Y. Young Oscar W., 104 Broadway, Brooklyn, N. Y.	-
8	Wire Goods, Manufacturers of, A. A. Arnold, New Bayer, Corp.	
8	Belmer H. & Co., Cincinnati, O Corning Jasper E., 35Cliff, N. Y. Ester W. S., 56 Fulton, N. Y.	Take B
11	Gilbert & Bennett Mfg. Co., 278 Pearl, N. Y	Sec.
13	Hasall William, 63 & 65 Elizabeth, N. Y	5 5
31	Roebling's John A. Sons. Trenton, N. J.	222
ne or	Wrenches, Manufacturers of. Austin J. & Co., 115 Liberty, N. Y.	0

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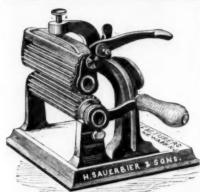
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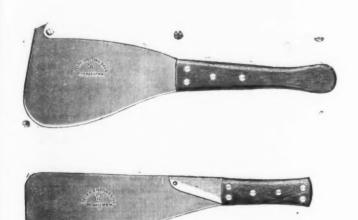
Keystone Saw, Tool, Steel and File Works.

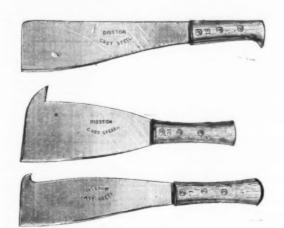
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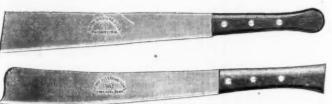
SAWS OF EVERY DESCRIPTION; TOOLS, FILES AND STEEL.



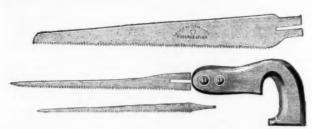








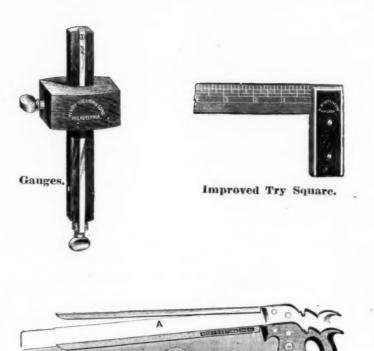
Disston's Celebrated Corn Knives.



Nest of Saws (Patented), Combining one each Key-hole, Compass and Table or Pruning Saw.



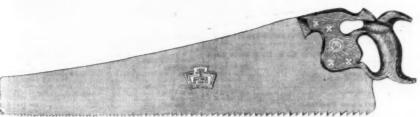
Key-Hole Saw and Pad.



Hand Saw, with Moveable Back.



Rosewood Bevels, 6 to 14 inch.



Patent Double Grip Skew Back Saw.



Patent Skew Back, No. 76.



Patent Improved Combination Saw.



No. 7 Hand Saw.

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HARDWARE.	Union Mfg. Co.'s Fancy Butts.— Figured Enameted Loose Joint dis 554-10 %	Washington Mills-Regular Nos	Screw Hook and Strap	Picture Nails and Ruebs. Brass Head
ZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZ	Boston Finish, Plaindis 80&10 %	Wellington Mills, Gratu # 10c. net	Heavy Welded Hook 18 to 12 lh., 11 c dis 30 % 14 lb. & up, 9 c dis 30 % (% to 1 in., 11c)	The file of the second
A n wils. ### increase	WHOUGHT INON.	Enameled and Tinned Ware. dls 40 @ 50 5	Screw Hook and Eye	Pinking Machines.
Arnitage's Mouse Hole gold 10% 10% Wikinson's W B gold 11c Eagle Anvils (American) B B Sc dis 20 %	Fast Joint, Narrow dis 40e.115 2 Lt. Narrow dis 30e.10 5 " Broad dis 40e.10 5 Loose Joint, Broad dis 40e.10 5 Table Butts, Back Flaps, &c dis 35e.10 5 Ingite Butts, Back Flaps, &c dis 35e.10 5	Glue Kettles	Solid Shank, C. S	First Quality
Apple Parers.		Door Lock	Grubdis 30 \$	Bailey's Patent Adjustable, new list Jan. 77. dis 25&10 g Bailey's "Victor" dis 25&10 g
Apple Parers. Bay State Parer, Corer and Slicer. \$\psi\$ doz \$12 00 net Improved Trun Table. \$\psi\$ doz 7:50 net Paultices Turn Table. \$\psi\$ doz 7:50 net	Loose Pin. Wrt	Wooddis 25 %	I DEDC S U. S. Crescent L'auteis, winer, y seccinions sons la	Defiance Adjustable, new listdis 25&10 g D. R. Barton Tool Codis 20 g
New Lightning	Light dis 40k10 \$	Fraucets. dis 50 % Francets. dis 50 % dis 40 % dis 40 % dis 50 % dis 40 % dis 50	Planters Glis 2062842 U	Ohio Tool Co
Angers and Hits.	Union Mrg. Co. Spring Hinges	Wood and Metallie dis 40 %	Hooks.	H Anhum Tool Co 's die ut e
Conn. Valley Mfg. Co. Douglass Mfg. Co. Ives Beecher (French, Swift&Co). 2d quality. dis 50&5 %	a Tull & Donton dia 60 a	Wood and Metallife	Bird Cage, Sargent's list dis 60&10 % Cotton. dis 50 %	Plane Irons, Defiance
Griswold	Seymour dis 60 & Shepard dis 60 & Call & Porter dis 60 & Call & Porter dis 60 & Call & Ca	Files. American File Co\$5 00 to £ currency—dis 30 \$	Bench—Hotchkiss' \$5.00 \$ doz	Middletown Tool Co
Beecher (French, SwiffactO) 2d quality dis 50&5 x	"Huffer (B 839,641) \$ "Garreson (B 60,610 \$ 40 and 50	Arcade File Works. \$5.00 to £ currency Auburn File Works. \$5.00 to £ currency	Bird Cage, Sargent's list	Sanduaky dis 25 c
Snell Mig. Co	Can Openers.	C. B. Paul's	** Sargent's list	Pilers and Nappers. Hutton's Patent
lves "Jennings" Bits	Can Openers. per dox \$3.00 dis 20 € Messenger's Comet. per dox 223 dis 5025 € American. per dox 375 dis 30 € Lyman's. per dox 223 dis 50 € No. 4. French. per dox 223 dis 50 €	Heller & Bros \$4 50 to & currency Hiscox File Mfg. Co. \$5 00 to & currency Johnson & Bro \$6 00 to & currency Madden & Cockayne File Co. \$5 00 to & currency Madden & Cockayne File Co. \$5 00 to & currency	Ceiling. Sargent's list	Hull's Patent Nippers. No.1, \$15; No. 2, \$31 \$\psi\$ doz dis 25 \$\frac{1}{2}\$ Eureka Pilers and Nippers. dis 25 \$\frac{1}{2}\$ Eureka Pilers and Nippers and Nip
Grisword's Patent Bitsdis 33 4 Expansive Bits, Clark'.small, \$18; large, \$26, dis 15 46 30 5	No. 4. Frenchper doz 2-25 dls 50 % No. 5, Iron Hangieper doz 2-25 dls 50 % 5	Jowitt's	Coat and Hat, Hart's list	Plumbs and Levels. Staniey E. & L. Co.'s Pat. Adjustabledis 60&10 g
Lewis' Single I wisk 1918. dis 25 or 30 y Anurewe Bits dis 40 dis 40 de 10 d Grisweid's Patent Bits. dis 20 d Exametre Bits. Clark'. small, \$18; large, \$25, dis 15 d 20 d Exametre Bits. Clark'. small, \$18; large, \$25, dis 15 d 20 d " [ves	Per dox \$2.00 2.25 2.50 dis 25 g Eureks	Butcher's	Wronght Staples and Hooks and Staples dis 40&10 % Wronght Staples and Hooks and Staples dis 75 % Stapley's list dis 40 Wire Screw Hooks and Eyes. dis 66&10&10 %	Chapta's
Hollow Augers, Ives'	Lyman's. Der doz 3:75 dis 39:8 No. 4. French Der doz 2:25 dis 90:8 No. 5. French Der doz 2:25 dis 90:8 No. 5. French Der doz 2:25 dis 90:45 Spragues. No. 1 2 25 2:60 dis 25:8 Eureks. Der doz \$7:00 2:25 2:60 dis 25:8 Eureks. Der doz \$7:00 dis 40:2 40:5 Serdine Scissors. Der doz \$7:00 dis 5:5 Serdine Scissors. Der doz \$7:00 dis 40:5 Serdine Scissors. Der doz	3. & Riey Carr 500 to & gold Stube 150 to & gold Butcher's 150 to & gold Butcher's 150 to & gold Butcher's 150 to & gold Walter So-meer & Co.'s "Diamond" 50 to & gold Fisher's 475 to & gold Moss & Gsmble 75 to & gold Theo. 1 turner & Co. (Feter A. Frasse & Co. 4 50 to & gold Stuber's 150 to & gold S	Wire Screw Hooks and Eyesdis 65&10&10 % Grass	
Hollow Augers, Ives	E. B. 1-10 fround	H. Diaston & Sonsdis 30 %	Grass	Pocket Levels
o. s. Ives Expansiveeach \$450—its 40 % "Universa! Expansive.each \$450—its 10 g. "Universa! Expansive.each \$450—its 10 g. "In the core \$2 ft. no acrow \$9			Horse Naits. Nos. 5 8 7 8 9 10 Ausable	Fletcher Post Hole Augersper doz \$3600, dis 20 5
" " Diamondper doz \$1.00 die 10 \$ Double Cut Gimlet Bits, Shepardson's	Ely's E. B	Mrs. Coles'	Ausable	Petnie Parers, &c. Bay State. "Saritoga" Peeler and Slicer. "k doz \$12.00 net
Cimiet Bits - Screw, \$7.50; no screw, \$9	" E. B. 1-10 Turned	Boyton's Cant	Buffaio Forged " Sie 28e 26e 25e 24e 28e National, Pointed and	"sar-toga" Feeler and Slicer # doz 9'00net Pulleys Judd's Axle
Morse's Bit Stock Drill , Liet of Jan'y 1, 75. dis 25 5 L'hommedieu's Ship Augers dis 20 5	Union Comme Comm	8 % See each dis 10 %	National, Pointed and Polished, Pat. Fin 29c 25c 23c 23c 20c 30c 80c National, Pointed and Polished, Ex. Fin 30c 27c 25c 24c 30c 30c 19c 19c 19c 19c 19c 19c 19c 19c 19c 19	Jap'd Screw
	Cetron	Tree	Perkin's P't'd—Biack. " See 25c 21c 30c 19c 18c Perkin's Pointed and	" Clothes Line
Vai ghan's Post Hole— 6 in. \$23 60; 7, 8 and 9 in. \$25 per dozdia 20 4 Lec1's	Wool. dis 15&10 \$ Carpet Niretchers. Cast Steel, Polished. per doz \$5.00 dis 30 \$ Cast Iron, Steel Polish. per doz \$2.00 dis 45&5 \$	Champion, 6 inch rolls	Perkins' Pointed and Polished " 27c 24c 23c 21c 20c 19c Perkins' Pointed and Blued " 27c 24c 24c 21c 20c 19c	Douglas Cistern etc new list die
Awis, Brad Sets, &c. Awis, Sewing, Common	**Casters. dis 55 %	Empire	Blued	S. & F
"Shouldered Peg. per gross 1:25—dis 15 \$ "Patent Peg. per gross 2:30—dis 15 \$ "Shouldered Brad. per gross 2:70—dis 25&10 \$	Deep Socket	" No. 2, 5-inch Roll	Star srand, 16c.; Morgan	Relt or Drive per doz \$2.00 : \$2.25 . \$2.50 die 20
Brad Sets, Alken s Der doz \$12.00 dis 40 %	Taggie Lemaners net Burnanon, Beckley Co. dis 60 % Sargent's dhe 60410 % dis 6045 % Union Nut Co. dis 6045 %	K. F. M., 4½-inch Roll	rutnam	Spring
	Union Nut Co	Domestic Fluter\$1500 each net Geneva Hand Fluter\$1500 per doz net	Herse Shees. # keg. \$8.92\/ R. l. Horse Shoe Co., Perkins' improved Light,	Sliding Door Wrought Brass 20 % 40, not
Axles. Common (Guy C. Hotchkiss, Field & Co.) \$ 30 4%c Solid Collar, Case Hardened, Chilled Box 30 3c	English Coll	Fluting Scissors	Med. and Heavy # keg, 3-9244 Mule Shoes # keg, 4-224	Bath Sidding Door, Wrought Brass \$\\$ 840: net \$\\$ 100 ftg \$\\$ 400: net \$\
A xle Grease.—Frater's	Trace, 54-10-2	The troils 5 00 each net	R. 1. Horse Shoe Co., Perkins' Improved Light, Med. and Heavy	Rakes.
Batances. Light or "Common" dia 25&10 5 All other Spring Balances. new list dia 50&5 5 Banes.—riated. new list dia 50&5 5	Dnfon Nut Co	Forks- Hay, Manure & Spading	fce Awis, Chiseis, &c. American fee Chisei	Case Steel
### and the stated	Jack Chain Iron	Name	National "	\$5.00 5.50 5.50 6.00 6.00 6.50 9 10 11 12 13 15 teeth.
GLEA. B ICHTCHICK A. CON &4 OO' GIR IN A	Chalk. \$\P\$ gross, 55c net White. \$\P\$ gross, 75c net Red. \$\P\$ gross, 75c net Blue. \$\P\$ gross, 90c net White Orayons \$\P\$ gross, 14c net	Fry Pans. & W., new list	Duniap s fting Picks	Razer Straps. 11 15 15 15 16 16 17 18 18 18 18 18 18 18
Heifs. dis 75 s "Extra Heavy. dis 40k10 s	Blue	No 0 1 2 8 4 5 7 8 Ganges	fce Awls, Chisels, &c. American foe Chisel. per doz \$6.50 net National per doz \$6.50, dis 10 % Novelty Ice Breakers per doz \$6.50, dis 10 % Novelty Ice Breakers per doz \$2.50, dus 25.5 Duniap s fing Picks. per doz \$2.50, dus 25.5 Duniap s fing Picks. per doz \$1.70, dis 60&10 % Wood Head Picks, Sargent's per doz \$1.70, dis 60&10 % Iron Iron Iron Iron Iron Iron Iron Iron	Hunt's
Hand, Light Draws	Chiseis Tool Co. (all kinds) dis 20 s D. R. Barton Tool Co. (all kinds) dis 20 s Socket Framing Crossman dis 60485 s Socket Framing Crossman dis 60485 s Hart Mig. Co., No 1 dis 604060410 s Martin dis 604610410 s Martin dis 604610410 s Martin dis 604610410 s	Ganges.	ice Axes Small, Cast or Maileableper doz \$1.50 net Kitchen Ice Tongsper 402 \$2.25 net	Torrey's. dis 2 % Saunder's. det 2 % Saunder's. det 6 10 % Mivetes. lron and Tinned dis 4 % of a bulk. dis 8 % of a bulk.
" Silver Chille dis 25 \$ " Globe (Cone's Patent) dis 20 \$1 0 \$ " Qankee dis 25£10 \$ " Yankee dis 35£10 \$	Hart Mig. Co., No 1 dis 60& 10 x 10	Staf Gis 85 5	Brass	Iron and Tinned
" Harkon's. dis 35 % Crank, Taylor's. dis 35 % 10 %	Witherby Tool Codis 60&10 %	Nail and Spike	Ames' Butcher Knivesdis 20 S	In bulk
Brook 8,0000 dis 50 % Cone's dis 60 % dis 60 %	" Hart Mfg. Co., No. 1 dis 60&10 % " Merril dis 60&10 %	Double Cut, Shepardson's dis 20 % " Hartwell's dis 40 %	" Bread " \$\psi \text{doz \$1'50-dis 15 }\$ Hay and Straw, " Wadsworth's" \text{doz \$1'50-dis 15 }\$	Rivet Sets
Lever, Sargent's. dis 60& 10& 10 f	" Hart Mig. Co., No.1. din 60&10 \$ " Merril. dia 60&10 \$ " Witherby Tool Co. dis 60&10 \$ Socket Corner dis 65 \$ 70 \$ Tanged Figures, extra. dis 40 \$	" Ives' dis 85% \$ " Douglass' dis 25&10 \$	Table and PocketSee Cutlery K nobs. Carriage (Jap'd 80 cents per gross)dis 60&10 \$	Btair
Brook's	Societ Corner	Tinned and Enameled	Base—Common. dis 30&10 \$	Legistra.
* Brook's		Grind Stone Fixtuers Sargent's Patent dis 70&19&10 \$	Plush Tip dis 10 x 10	Acme (Anti-triction)
Cow -Common Wrought	ron, Providence Tool Co.'s, Wrt. Iron	" Douglass' dis 25&10 \$ Glue Pets. dis 35 \$ Flamed and Enameled. dis 35 \$ Family, Howe's "Eureka" dis 25 \$ Griss Stone Flatters Griss Stone Flatters Sargent's Patent dis 70&10&20 \$ Hart Mig. Co.'s. dis 60&5&10 \$ Hart Mig. Co.'s. dis 60&5&10 \$ High Bross. dis 45&5 \$ dis 45&	" Plated 9 doz 6-25 & 2 % for cash " Por 9 doz 6-25 & 2 % for cash Furniture Plate	Manila% inch and larger w b 14%c
Western dis 238:10	From Providence Tool Co. % Wrt. From	Hammers. Rmmet Hammer Co.'s Handleddis 25 %	" Wood Screwsdis 20 %	Sarn Door
Dodge's Genuine Kentucky, new list— Nos. 0 1 1/2 3 4 5 6 Hog.	" Cabinet, Sargent's	Hammer Co.'s Handled	Melting Hart's dis 55&10 g	Sisal Sinch and larger # 3 11 c
" Yew's Genuinedis 40 4		Henry Hammonds'new list Junes, 18:7. dis 15&5 \$ Chency's, Steel Face and C'aw	Lanterna.	Sinal
Bellews. Common dia 20 @ 35 C	BOPTQ BIOL BOX BOTQ BIOL BOX BOTQ BIOL BOX	" all steel dis 208: 0 \$ Verree. dis 5 \$ Magnetic Tack dis 5 \$ Magnetic Tack dis 20 \$ Magnetic Tack dis 20 \$ Magnetic Tack dis 20 \$ Hang Cuffs and Leg Irons. dis 10 \$ Tower's Hand Cuffs. \$4 00 per pair. dis 25 \$ Providence Tool Co.'s Hand Cuffs. \$15 per doz \$ Leg Irons 25 \$ Handles.	Molroce Patent	Chapin's
Moulders'	French Steel	Warner & Noble's	Brady's Patent	Standard
Blind Fasteners. Domestic # 602 \$5 -dis 20 \$ Blind Fasteners. dis 80 \$	Cook'sdis 15 % Excelatordis 40 %	Providence Tool Co.'s Hand Cuffs \$15 per doz dis 10 g	De Beque	# 3 3 34c net
Bijud Fasteners. dis 30 c Mackrell's. No. 2000, \$i4*00; dis 25 c Van Sand's. No. 2000, \$i4*00; dis 25 c Old pattern. per gross, \$i1*50, dis 5 c Washburn's Patent. \$\pi\$ gross \$14*00 dis 25 c Merriman's. new list net	Coppers' Tools. Bradley'sdis 15 @ 30 %	Annales. Door or Thumb Latches—	Lard Fresses. Draw Cut, 14 Incheach \$65 00—dis 20 % Enterprise Mfg. Co	Self-Heatingper doz \$9:10 @ 9:25 net " Tailorsper doz \$19:00 net
Manburn's Patent	Cespers' Tools. dis 15 @ 30 g	Nos. 80 1 2 3 4 Per dos 80 100 1.18 1.35 1:30 die 60&10 \$	Yankee	Mrs. Potts
Bilacks.	Corn Knives and Cutters. Bradley s	Roggin's Latches	Dunlap's Improvedper doz \$6.00 net Sammis Patentper doz \$5.00 net	Bacder & Adamson's Flint, 00 to 114 \$4 25 \$\psi\$ ream 2,214 & 3. 4 75 dis 4 25 \$\psi\$ Assorted. 4 25 15 5
Pilocis. dis 30 5 Differential Pulley Blocks. dis 30 5 Tackie, 160pe and Iron Skrapped, Providence Tool Co.'s list. dis 30&10 5 Stanley Rule and Level Co. dis 35&10 5	Crew Hars. P B 9c. net Cast Steel. ₩ B 5c Lron. steel points ₩ B 5c Crestling Irons. ₩ B 7c. 5y Curling Irons. № dox \$6 3/ % X in \$150, \$200, \$240. ₩ dox \$6 Pinching Irons. ₩ dox \$7 50—dis 15x № dox \$7 50—dis 20x №	Surrace Chest, Sargen's list. dis 60&10&10 % Flush Chest. dis 60&10 % Lifting. dis 60&10 \$	Linen Fish dia 20 <	** Star. ** Fream \$3 25 15 5
Stanley Rule and Level Codis 354:10 \$ Biowers. Keystone Portable Forge Codis 30 \$	Crncibles. Gautier & Co	Saw and Plane dis 28&10 % Boynton's X Cut (Loop) dis 20 % " X Cut (Centennial) dis 15 % Hammer and Hatchet dis 10 %	Cotton Chalk dis 50 % 8tl. Lake Chalk Noa. 0, 1, 2, 8, \$6,6'50, 7, 750, dis 20 % Mason's dis 20 % Wire Clothes, Gai'd each 50c. net	New England, same list as B. & A. Flintdis 15 % H. B. & M. Roman Flint
Reystone Portable Forge Codis 20 S	Curing Tongs	Hammer and Hatchet	Cabinet—Gaylord)	Common B & 16 @ 19e net
Holta	Curry Combs. Curry Combs. Curry Comb Mrg. Co. dis 38-8-10 dis 3	N. Carolina Handle Co	Eagle STRUME Crane's, List Jan. 1, 71. dis 254 Langstroth & Crane's, List Jan. 1, 71. dis 40&10 \$ Flat Key. dis 40&10 \$ Flat Key. dis 25 \$ 50.0 \$ Barnes & Deltz. Flat Key. dis 25 \$ 50.0 \$ Yaie Lock Co., Flat Key. dis 20 \$ 50.0 \$ Yaie Lock Co., Flat Key. dis 20 \$ 50.0 \$ Continents1. dis 25 \$ 50.0 \$ Contine	Patent
Square	Hotcakias' & Kellogg's, iron & Brass, eid list dis 40&7 \(\) \(\) Hotchkiss' Novelty	Apple " " ass'td " 6 00	Round Key	Raw Hide
" Flush, Stantey's	Wood Tooth (Fuller Bros.)	File	Yale Lock Co., Flat Keydis 40 1 Sargent & Greenleaf, Flat Keydis 20 5	Sush Lecks. Clark's Nos. 1, \$10-00: No. 2, \$200 per gross dis 40 5 Ferguso's dis 40 5 Norvich dis 25 8 Walker's dis 10 5
Sargent's .018 308-106-10 4	Cockeyes 11c in 9te : 15c in 85c : 15c in . 87c net	Auger	Continental	Walker'sdis 10 \$ New England dia 20 \$
" Sheitou's(ols list) dis 60&20 \$ Union Nut Company, old list	Cocks. dis 50 s	### Tanger, Ives harge 700 Patent Auger, Ives dis 25&10 \$ ** Douglass per set \$1 25-dis 10 \$ ** Swan per set \$1 25-dis 10 \$ ** Swan per set \$1 00-dis 20&10 \$ ### Hangera Barn Door dis 70×10 \$ ** Anti-Friction No.1, \$1 25; No. 2, \$1 50 \$ ** Pr. dis 40×10 \$ Novetty dis 40×10 \$ ** Anti-Friction dis 40×10 \$ ** Anti-Fri	Platenew list dis 33% 62 % Trenton	Sash Weights.—Solid Eyes # 5 11/40 Sausage Stuffers or Fillers.
Brove—American Screw Co. s	Lever Bibbs	"Anti-Friction" No.1, \$125; No. 2, \$150 # pr.dis 40-810 \$ Novelty	Branford. Norwich. Russell & Erwin. List of Jan. 1, 1877.	Perry
** R. B. & W	Cutlery. Am. Pocket—Humason & Beckley Mfg. Codis % «	Charlenge dis se's	Norwalk dis 55 % Nushua and 2 % for cash Mallory, Wheeler & Co.	Walker*
Union Nut Co	Turior Tu	Judo's 14'00, dis 50 %		
Horing Machines. Upright. Angular. Hovey's, no Augers	Dippers Dipp	Hotchkiss' dis 10 % Andrews' dis 45 %	Padiocks, Riuseil & Erwin. dis 33/4&5 5 Mailory, Wheeler & Co. and 2 % for cash American Lock Mfg. Co. ais 33/4 5	Dission sCircular
	" Rimmedper doz \$ 75—dis 20 \$	Sargent's dis 60% 10 % New York Wire dis 20% 20 % "German" dis 60 %	" American Lock Mfg. Co ais 3834 % " Romer's	" Cross Cut. dis 20 % " Hand, Panel, Rip, &c. dis 20 % II. W. Peace's Circulars dis 25 \$
Kellogg's, no Augers 5°25 6°7. dis 15 x 6weets 5°0 6°0 net with Augers 5°06 6°0 net Snell's 6°2 dis 25 4 Phillips' with Augers 10°00 dis 25 5	Dog Collars dis 20	German	Romer's	Bpear & Jackson's 53 50 5 £ gold
Snell's. 475 625 dis 25 % Pullips' with Augers 10 to dis 25 %	Door Springs.	Lathing, " 123	" Narnes & Deitz	" One-Man, all lengths
Union Nut Co		Hunt's dis 25 \$ Shingling, Nos. 12 \$. \$\psi\$ doz \$7 25 \$ 800 \$ 25\$ Cla*, "12 3. \$\psi\$ doz \$7 25 8 50 9 25 Lathing, "12 3. \$\psi\$ doz 7 50 8 25 9 00	" Miller's Patent. dia 40 9 " Penn Lock Works. dia 53% 4 " (Scandinavian) dis 50 % Mulleta.—Hickory and Lignumvius. dis 20 9	# Billet Webs per doz #10, dis 40% % 5 "Pruning dis 40 % 7 Wheeler & Clemson Mfg. Co.'s Band dis 51 % "Cross-Cut dis 51 % Livingston's Butcher and Kitches dis 20 @ 25 %
Hotchkiss"	No. 1, Large, Japanned	Shingling, Nos. 123	Meat Cutters, Dixon's (P. S. & W.).Nos. 1 2 3 4 \$\pi\$ doz. \$14 00 \$17 00 \$19 00 \$30 00 dis 25 \$	L'vingston's Butcher and Kitchendis 20 @ 25 % Livingston's Framed Wood—
Byraces	No. 1, Large, Japanned per doz \$3790 dls 10 \$ No. 2, Medium, " per doz 200 dls 10 \$ No. 5, Small, " per doz 200 dls 10 \$ Challenge (Coil) Nos. \$7 6 Japanned per doz \$700 2750 550 Coppered per doz 4700 4750 550 Galvanized per doz 5750 400 4750 dls 10 \$ Nickeled per doz 5750 400 4750	Lathing. " 123	Mtles ChallengeNos 1 2 3	Nos. 10; 102 108 104 105 Per doz \$10.00 8.75 10.00 7.50 6.25 net
Spofford's Patent	Coppered per doz #*00 4*00 5*00 dls 10 g Salvanised per doz #50 4*00 4*00 7*00 Nickeled per doz 5*50 6*00 7*00 Nickeled per doz 5*50 6*00 7*00 Nickeled per doz 5*50 6*00 7*00 Nickeled per doz 5*50 6*25 5*00 dls 30 g Nickeled per doz 1*00 9*50 8*00 dls 30 g Sar (Cou)(For Cop'd, Nickel Plated, &c., see list.) No. 3. Small per doz 2*50 dls 15 g No. 7. Large per doz 5*50 dls 15 g	Claw, " 128	20 A A A A A A A A A A A A A A A A A A A	DRW Dets.
" "Novelty" dis 50 % Common Bsh (American) dis 25&10 %	Premium (Coft)— Nos. 1 3 3 - Japanned Per doz \$7.50 6:25 5:00 } dia 30 5	Simmon's dis 25 s Shingling, Nos. 0128 w doz \$7 50 8 00 8 50 9 00 Claw, 128 w doz 9 00 9 50 10 00	Hales'	Boynton's Patent. dis 40 s
Brackets.—Sheif	Star (Coll)—(For Cop'd, Nickel Plated, &c., see list.) No. 5, Smallper doz \$2.00)	Claw, 128 4 doz 9 00 9 50 10 00 Lathing, 128 4 doz 8 00 8 50 9 00 Broad, 128 4 doz 9 00 10 00 12 00	Draw Cut., Nos. 5 2 6 8 10 Each \$5000 \$75.00 \$8000 \$225.00 \$10000—dis 20 5	Nash's
Sargent's	No. 6, Medium	78 P doz 20 00 22 00 D. R. Barton Tool Co	American dis 25 \$ No 1 2 25 8 4 B 6 Fach \$5.00 \$7.50 \$10.00 \$12.00 \$25.00 \$50.00 \$60.00	** Bemis & Call's
Humason. Beckiev & Co.'s dis 60 4 Union Kut Co. dis 60&5 5 Butchers* Cleavers. Humason & Beckiev Mfg. Co. dis 20 5	Barker's Concessed	Shingling, Nos. 1 2 3	Stebbina' Patterndis 62%&10 %	Boales.
Humason & Beckley Mfg. Codis 20 % D. K. barton Tool Codis 20 % Bradley b	Drawing Knives. dis 60&5 g Crosman's No. 1. dis 20 g D. R. Harton Tool Co. dis 20 g Hart Mfg. Co., No. i. dis 60&10&10 g dis 20 g dis 20 g	J. P. Verree & Codis 5 5	" Tinned ends	Boales
Beatty's dis 2/8 Beatty's dis 2/8 \$1650 \$1900 \$21:0 \$24:00 \$27:00 \$30:00 \$35:50 \$36:50 Hart Mfg. Co. dis 508:00 \$	Nobles Mfg. Co	Lathing. " 123	Weed's dis 15 %	Turnbull'sdis 20 @ 25 \$ Brown'sdis 20 @ 25 \$ Fairbanks'dis 2005 \$
Hart Mfg. Co	Hart Mfg. Co., No. 1.	Shingling, Nos. 128	Genuins Genu	Turnoull's dis 20 & 25 8 Brown's dis 306 & 25 8 Brown's dis 2565 \$ Fairbanks' dis 2665 \$ Fairbanks' dis 2665 \$ Chattlion's Grocers' dis 2665 \$ Chattlion's Grocers' dis 266 \$ Chattlion's Grocers' dis 266 \$ Chattlion's Grocers' dis 26 \$ Chattlion's Grocers' dis 26 \$ Chattlion's dis 25 \$ Chattlion's dis 2
# # # # # # # # # # # # # # # # # # #	Biacksmiths each \$2 50 dis 10 \$	Lathing, 123		
Cast firassdis20 \$	Breast, Alken'sdis 25&10 \$	Half Hatcheta, Nos. 123. # doz 8 00 8 50 9 00 Claw, Nos. 123. # doz 9 00 9 50 10 00 Lathing. 128. # doz 8 00 8 50 9 00	Natis	Scale Beams. No. 1 300 to 1300 lba
Fast Joint, Narrow, dis 45 \$	Wilson's	Broad, 234 4 doz 11 00 13 00 14 50 567 4 doz 16 50 18 00 19 50	Oakum. Best. \$\P\$ b 10\foralle{\text{b}}\$ CU. S. Navy. \$\P\$ b 9\foralle{\text{c}}\$ CNavy. \$\P\$ b 8\foralle{\text{c}}\$ CNavy.	Box, 1 Handleper dox \$6.00, dis 10 \$
COMPON CAST, NOT BELLED. Cast Joint, Narrow	"Ingersoli's (old list)	Lath, " 123 \$ doz 4 75 5 00 5 25	Navy	Defiance Box and Ship
rariiamen, Butts & Mayer's Hingesdis 55 % cash.		Half Hatchets, Nos. 128. # doz 4 75 5 00 5 25 All pot. Sh'gling ** 128. # doz 5 25 5 50 5 75 Solid Steel Lath ** 148 # doz 7 25 7 50 7 75	Brass and Copper new list, dis 40 % Olmsted %	Favorite Family
Loose Pin dis 60 s Accord Pla Japanned dis 60 s Loose Pin Japanned Tipe dis 60 s DRILLED AND WIRED.	Automatic Boring Toolseach \$275, dis 23 a	Hay Knives.—" Lightning " per doz \$40 00 net Wadsworth's	Malleable	Hart, Bliven & Mead. dis 55&10 % Douglass Mfg. Co. dis 55&10 %
Fast Joint, Narrow	Morse's Beach Patent	Gate, Western	Pencils dis solid S Faber's Carpenters'. net	Disston's
Fast Joint, Narrow	Egg Beaters. Dover	Gate, N. Y. State	Round Gilt	No. 2
Loose Pin, no Acorn. dis 575 Acorns dis 575 Loose Pin, no Acorn dis 575 Loose Pin, no Acorn dis 575 Loose Pin, no Acorn dis 575 Acorns dis 565 Loose Pin, no Acorn dis 575 Cash.	Schofield. \$ GOZ \$3'50 EMBERY. Because For	Rolled Estated dis 60&10 % Wrought Strap and 1 % dis 60&5 % dis 60&5 %	Picture Cord (Wire). Tinned (Williams, White & Church'll)dis 90 6	Roung Head Iron Am. Sc. Co
" Acords dis 55 " Japanned dis 60 " Plated Tipe dis 55	Flour and FF S 4c dis 10 s	All poi. Sh ging " 128. \$\psi\$ dox 525 5 50 5 75 Solid Steel Lath " 128. \$\psi\$ dox 725 7 50 75 Hay \$\psi\$ anives. " Alghtning " per dox \$\psi\$ Co net Wadsworth 8.	Gold Plated " " dis 70 %	Bound Head Brass, list Sept. 1, 75, Am. Sc. Codis 40 &

Brass and Silver Capped, List March 1, 75 dis 40 s Lag or Common Coach, New List March 1, 76dis 65 s Coach, Patent Gimlet Point, List Jan. 1, 1853 dis 40 @ 50 s	Hull & Beiden's "Climax"	Wire straightened and cut, smaller than No. 8, and not less than 2 feet lengths. Mc	Bine, Prussian, fair to nest
Coach. Patent Gimlet Point, List Jan. 1, 1855.dia 40 @ 50 g Bed. dia 10 g	Hull & Beiden's "Climax" dis 25 €	whe strange the distribution of less than 2 feet lengths, special rates. Twelve cents per b. extra for special go 1 b. special	Bine, Prumian, fair to nest
Machine—Fiat flead, Iron, Am. Screw Codia 10 9 Round Head, Iron,	Bemis & Call s Patent Combinationdis 20&5 \$ Merrick's Patterndis 25&2½ \$	Common Plain Brass Pail Ears	Brown, Spaniest. "Van Dyke. Carmine, 40. Carmine, 40. Creen, Chrome. 15 62 23: "Spect"
Nettlefold's Brass	Aiken's Pecket (Bright)	High Reass Scrap, 16 conts	in oil
Hand die 23&10	Wingers. Per doz. Universal, without Cog Wheels. \$34'u with Cog Wh'ls, No. 2½, small fam'y size 63'00	low 18 cents. oliding. 20 cents. lurnings, Filings and Chips the price of Scrap.	Parts
Hand Hall, Sargent's. dis 55&10 ft Handson, Becking & Co.'s. dis 40&5 ft Jack—Bell Bottom. dis 15	Crown No. 2	Terms-Net casn. Intere be added afte thirty 1948.	CAPE.
Scythes Biood's German Steet, Grass 9 dos \$10 00	"No. 3	Plain to No. 20 inclusive, above 1/4 in. to 3 in \$0.40 above 3 in	In Oll asst'd cans, 11c: kegs, \$\sc Putty in bladders
Blood's ferman Steel, Grass Work Wo	Household, no Cog Wheels. 54:00	Nos. 24, 23, two cents advance on List for each Number. Nos. 24, 2 28, four cents advance on List for each	"Indian, dry 10c "in bulk. Hose Pink 10 © 15c Rotten Stone, soft, Reglish Stepna American, Raw Solvite Tunenvite.
Elood's Excelsior and Granger doz 11 00 dts \$1:50	Empire we st	Number.	Stenna American, Raw to Spirita Turpentine Strict Stude to Hard Strict Stude to Stud
Young America	Novelty, No. 10, with Cog Wheels	Plain & Irch	Raw
Bush dis 20	I Excelsior, No. A. with folding bench		Raw
Shears and Scissors.	No. E. for set tubs	Fancy Tubing to No. 20 48c	Vermillion, Chinese. 1 00, gold Single Thick.—Discount 60 Knglish 724cc gold sizes. 1st. 20
Cast 1709 dis 40 7	" No. 2%. Wood Frame, Purchase Gear 66'00	Tubing Sawed or Cut 2 to 4 feet long, 2 cents ad-	** American, Common
Scissors dis 50 s	No. 11, Wood Frame, Common Gear 63'00	Add to 2 cents 1/4 cent for each additional cutting	Edge
Sheaves. Eliding Door, M. W. & Co. list	Commission of Manager and Mana	All Mandrel Drawn Tubes under % in., 25 cents per pound ad ance.	Tellow Ucline, French 150 150 110 110 110 110 110 110 110 110
Patent Roller,	Planished Tin Ware dia 20 €		Waite, Faris, Kngins, prine In bbls. 25 @ 2 c 15 x 35 to 21 x 39 12 25 10
## Hathele's	METALS.	Fancy. 31 Scotch and Extra Patterns. 34 GERMAN SILVER TUBING.	Zinc Walte, American No. 1 dry
WOOLE B With-Liferion	I TROX Dury Harm I to 1 & cents per lh. Sheet Rond	4 Per cent	Freign (Fars) 11c Double Thick.—Discount 60.
Shovels and Spades. dis 36 9 Ames. dis 51 9 Rowland's dis 51 9	none of the above Iron shall pay a less rate of duty	12 44 110 120 120 120 120 120 120 120 120 120	" Boiled 81c. " 82c 6 x 6 to 10 x 15 812(0 81)
Old Colony	cents per lb.; Wrought Scrap, \$8 per ton; Cast Scrap,	16 * 146 18 146 18 146 18 146 18 146 18 18 18 18 18 18 18 18 18 18 18 18 18	Walso, Crude
	Plate, 1% cents per 10.	SIMPLET DESCRIPTION OF THE PROPERTY OF THE PRO	Seal, Extra Refineded.
Dunning s Shovels and Scope Gis Soure, s Shovels and Tengs Iron and Brass Head, h. & E. list Gis Soure, s Fart s Gis Soure, s Polished Steel Gis Soure, s Gis Soure, s Gis Soure, s Fart s Gis Soure, s Gis Soure, s Fart s Gis Soure, s Gis Soure, s Fart s Gis Soure, s Gis Soure, s Gis Soure, s Fart s Gis Soure, s Gis	Foundry No. 2	at 7 cents perlb., or under, 2% cents; over 7 cents, and not above 1, 3 cents per lb. over 1, 3% cents per lb.	Sect
I Olimania Decomposition	BCOTCH.	way Bars, in part Steel, I cent per lb. Provided, that Metal cemented cast or made from Iron by the Resse-	Spring
States. Square Frames, Round Cornered, by case	Coltness 25 00	scription shall b classed as	Natura Lubricating
Spoke shaves. Defiance Metallic	Am. Renned, at mill	Tool	Asphaltum
Penance metalitic dis 33%&10 %	Steel, " 47 00 @ 50 00 00 00 00 00 00 00 00 00 00 00 00	Homogeneous12%c	
### No. 1, \$15'00; No. 2, \$12'00 \$40.5 dis 49; No. 1, \$15'00; No. 2, \$12'00 \$40.5 dis 30, \$41.5 doi: 10.00 \$10.00	Scrap. Wrought Scrap, from yard " 24 50 @ 25 00		PRATT & CO.,
Ives'No. 1, \$15:00; No. 2, \$12:00 @ doz, dis 33%&tiv ? Douglass'per doz \$9:00 dis 25&10 %	Common Iron.		Hardware & Iron Merchants, Buffalo,
Tinned Irondie 10 die 20	to 6 12. x % to 1 in 1 b 2 1c		
By the case:	1 to 6 in. x % to 1 in	Tool.	THE FLETCHER POST HOLE AT
Derby Silver Co	Rods—% and 11-16 round and square	Machinery # 12c and upward Hammer # 15c	THE PRESCRIPTION TOST HOLE AC
Rogers & DrO- A Us swall	Swedish Iron. Ordinary sizes	Gun or Homogeneous	
Holmes, Booth & Haydens	Plow size	Bout Cast 30 % 178/o	one, and is run with less power; works readily in clay, sand, gravel, and will cut sharply through grass or root sods without the use of show
German Silver (Hall & Elton)	Nos. 10 to 20	Extra Cass. 18%c Round Machinery, Cast. # 15 10% @ 11%c Swaged, Cast. 9%c Best Double Shear. 17%0	start it.
Tess. \$1.50 9 gross, net Tables. 2.75 net Tin (Cowles Hdw. Co.)	21 to 24	Brister, 1st quanty 1940	The ordinary flat bottom post augers in use are easily broken, bent while the blades split and crack with strong pressure. The "Fletcher tand any force policitor with the control of the
Stencil Combinations -Stafford Mfg. Co	28	derman Steel, Beet. "11½C de 2d quality "10½C 3d quality "10½C	stand any force applied to it, while its peculiar construction enables it t point and over lapping blades, in such a manner as to push itself
Inch. 100 10	27. 4 C 5 C 28. 5 Kg C 34 Quality # 8 C 5 C Galvanizea, 14 to 20, prime, # B 7 kg C; 28 quality # 8 C Kg C 28 to 28	Sheet Cast Steel, 1st quality	
Hinnostan Stone D bc	Patent Planished	File Steel, Flat and % Round "12%c	34
** Axe Stone	Russia, Nos. 8 to 16. # b 121/6 @ 18c "Stained, No. 1. "12c Am. Cold Rolled "4kc	* Mill. " 13½c * Taper to 4 Inch. " 16c * Taper 3 and 8½ Inch " 18c	PATENT PALIBUED MANON PIZES
Washita Stone	Am. Cold Rolled	ANTIMONY 14 @ 14%c. currency	
Silps	\$4 5 5\\ 450 5\\ 250 \$50 \$450 \$525 \$50 per doz. RUSSIA IBON.		
Grindstones, Family, Loring'sdis 10 % Stove Folism. Joseph Dixon's		Garman Roffned 6kg gold	smoothly into the ground. Obstructions, such as old filling of tin s
Gem # gross \$4 50 dls 5 7	COPPER-DUIY. Pig, Bar and ingot 5c.; old copper, 4 cents # \$; Manufactured (including all articles of	American	boxes, and miscellaneous articles, in made soil, and roots, grubbings, land, are cut by the Fletcher, where other styles of post augers are brol
Wildlife Offer	ve (orem.	Tin Lired Pipedis 10 %	This auger costs a few shillings more than others, but the purchaser views, find it the cheapest in the end.
Squares Steel	Knglish ***********************************	Sheet	There is no suction when this auger is drawn from the hole; it brings out, when filled is easily lifted out and emptied. Strongly made, simple
Try Squares and T Bevels	Braziers Copper, ordinary sizes, over 16 oz., per square 1001	M. P. U	to use, self-sharpening, by its peculiar manner of cutting. Always read. This auger is now ready for the market, and we offer to the trade a lit.
Star Try Squares and Bevels. dis 35 g Disston's Try Squares No. 1. dis 30 g No. 2. Improved. Nos. 1 & 2. dis 30 g Winterbottom's Try and Mitre. dis 30% 10 g Tacks, Hrads, & C List of January 1, 1970. Tacks, Half Weight, American. dis 75 & 1976.	Braziers Coppet, ordinary sizes, 16 oz. and over 12 oz., per square foot	SOLDER	from the listRetail price, no
Winterbottom's Try and Mitredis 200:10 % Tacks, Brads, &c.—List of January 1, 1870.	Circles less than 54 inch in diameter	MPRITER-DUTY: In Pigs. Bars and Plates \$1 50	To the trade \$3.00 each. Less 20 per cent. G. B. WALBRIDGE & CO., New York Agents.
or TT-18 to Amendon des 198 to	LOCOMOLIVE FILE BOX DIRECTOR	per 100 lbs. Silesian, cash	- ''
" Carpet, Am. and Swedesdia 104 for cash	Sheathing Copper, 3ver a sq. ft. and dighter 3sc. 4sc. 4sc. 4sc. 4sc. 4sc. 4sc. 4sc. 4	TIN-DUTY: Plates, Sneets, Tagger and Terne, 11c.	"CHAMPION"
Hair Sweuce us 50a dis 10 s Frair Pull Cappet, Am. and Swedes dis 10 s for cash Cappet, Cather Head. dis 10 s Grada, Haif Weight. dis 50ac Shrae Naller	Boit Copper	TIN-DUTY: Plates, Sneets, Tagger and Terne, 1'lc. per lb.; Electro-galvanized Plates, 2 cents per 2; Manufactures of, not enumerated, 35 per cent. adv. Bare, Block and Pigs, free. Banca, subject to duty of 10	
Shoe Nails— 4-8ths and longer, 9c.: 314-8ths, 914c. E B, dis 10 % Trunk, Clout and Finishing Nails—		percent.	IMPROVED ICE CREAM FREEZ
25 2) 17 13 13 11c. # m. dis 10 4	Secaning Copier, times on the suc, by the case. Case. For less than a case. Sor # sheet Tinning Sheets, ordinary sizes. Syc. # sq. ft For tinning both sides double the above amount.	English # 5 19 @ 20c., currency	
Double Pointed Ticksdis 4045 %	O'HEILL'S PATENT PLANISHED COPPES,	12x12 } Prime Charcoal	Not the CHEAPEST, but the BEST
Tap Borers. dis 25&10 % Ives' Tap Borers. dis 10&10 @ 25 % Enterprise Mfg Co. dis 20 %	14 and 16 oz. and heavier	12x12 Frime Charcoal	FOUR STYLES16
Tapes, Measuring. American Flask and Cap Co	7 in., 14x50. 8 in., 14x56. 9 in., 14x60 i4 and 16 oz. and heavier	D C 125x17 "	GEARED FREEZ
Tea Trays. American Tea Tray Codis 15 5	14 and 16 oz. and heavier	D X 1234x17 " 9.75 For each additional X add	No. 19 2 quart. No. 24 No. 20 3 '' No. 25
Thermometers. The Case	12 OF 44C. "	I C 10x14)	No. 20
Enterprise Mfg. Co. (Champion)dis 20 % Wood Bottomper doz \$12—uis 30&10 %	Brown & Sharp's Gauge the Standard for Metal; Old English Gauge the Standard for Wire. BRASS MANUFACTURERS' PRICE LIST.	TRENE PLATE. Prime Char. 2d qual. Coke.	No. 23 8 44
Toe Calks.	January 1, 1877. Cash prices for Roll and Sheet Brass. For less quantity than i@ pounds, add 3 cents per pound.	I C 14x20\$6 50 @ 6.75 6.25 @ 6.50 5.75 @ 6.00	FLY WHEEL FRE
Toe Calks. Winsted Winsted 10c., dis 5 @ 7½ % Tingers' Tools and Machines. P. S. & W. dis 10 %	All Man not thinner than to No. 28, wider than 2 to	1 X 20x28 19-50 13-00 (a 13-50 12-00 (a 13-00	No. 28 16 quart. No. 30 No. 19 No. 31
F. S. 66 W	not wider than 14 in	I C 14320 M F. Brand \$8-00 ZINCDUTY Pig or Block, \$1 50 per 100 lbs. Sheet	FRAME FREEZ
Game, Newhouse. dis 25&2 \$ " Peck, Stow & Wilcox dis 45 \$ " Hotckhiss old list dis 45 \$ Blake's Parent dis 49 \$ Mouse, Wood Choker # doz holes, 15 @ 160 \$ " Fatent Unoker (Union	All Nos. to No. 28, inclusive, and widths over 2, to 30 in, inclusive.		No. 33
Mouse, Wood Choker # doz holes, 15 @ 16c	30 in. inclusive	Орев 8с	No. 34 DUPLEX FREEZ
Round, Wire # doz #1 50 to 2 00 net	Sheets 24x48 in., and all sheets cut to particular sizes	Paper Stock, Old Metals, &c	No. 32
Cage. W doz 2 50. dia 10 2 50. ret le Catch-em-alive. Der doz \$4 00 net	Sheets wider than 30 in and under 40 in		SOLE MANUFACTUR
" Catch-en-slive. B dox \$4 00 net Treweis. Lothrop's Brick and Plastering. dis 10 f Disston's Brick and Plastering. dis20 g Peace's Plastering. dis 20 g	Circular sheets, in diam. from 4 in. to 14, inclusive41c	Canyas linen	
Disston's Brick and Plastering	Circular sheets, in diam. from 4 in. to 14, inclusive	White linen rags. No. 1	Sidney Shepard
Rose's Brick dis 5 S Brades' Brick gold. dis 10 S Worrall's Brick and Plastering dis 20 S	LOW RRASS. Four cents * D more than High Brass. Gilding Metal ?c, * D more than High Brass.	Colored	Buffalo, N. Y., and Chic
	Gilding Metal FC, W B more than High Brass. In Bars	Soft wooleds	Dullaio, N. Y., and Unio
Triers. Sutter and Cheese. dis 25 % Ventilators (Window). Sigkel and Gilt. per dozen \$16 00 @ 19 00	Platers' or Gold Metal Sawed	Kentucky hagging	
Vises. Old Box, Trenton	Metal in width 2 in. to ½ in. to No.28, inclusive, er b. advance. Metal, in width 2 in. to 1 in., thinner than No. 28, 2c. per	Rope cuttings	G. B. WALBRIDGE & (
" Peter Wrights	S. advance. Metal, in width 1 in. to ½ thinner than No. 28, &c. per B.	Gunny bagging. Jute Butts. 24 G 25 Kentucky bagging. Bope cuttings. Kentucky Baie rope. 4 G 45 Oakum junk, No. 1. So 55 Grass rope. 38 G Grass rope. 38 G	
Peter Wrights	advance. Metal, in width ¼ in. to ¼, inclusive, not thinner than No. 28, 2c. per 3. advance. Metal, in width ¼ in. to ¼ thinner than No. 28, 5c. per 3.	White Couar Cuttings, all paper	83 Reade Street, New York.
	advance.	Hard White Snavings, No. 1	
Merrill's dis 15 %	Metal, ¼ in. in width and less, 10c. per lb. advance Any of the above widths cut to particular lengths, add 7c. per pound.	White Shavings, No. 2	Kitchen Ice To
* Stevens'. dis 25 \$ Simpson's Adjustabledis 25 \$	GENAN SILVES MARKET METAL AND WIRE. Market Metal. Wire.	Imperfections, No. 2, best folded sheets	MILOHOH IOO I O
Simpson's Adjustable dis 25 %	4 per cent., 12 in., to No. 26	" No. 2, light	MADE FROM
Cunal (Pugsiey & Chapman)	10	White Shavings, bark white. Mixed shavings, bark white. Mixed shavings, bark white. Book Stock, Mixed. Book Stock, Mixed. Mixed shavings, bark white. Book Stock, Mixed. Mixed shavings, bark white. Book Stock, Mixed. Mixed shavings, bark white. Mixed shavings, bark s	Date Date 1
Wheel Barrews	German Silver Sheets over 13 in. wide, and weighing more than 16 Bs., \$2.25 per b. Advance 2c. for each additional in., in width above 12	Bogus Manilas and Hardwares 1 6 1 1 1 1 1 1 1 1	
Wire. Brass and CopperList of Jan. 1, 1877, dis 10 %	in., and 2c. per B. on each No. thinner than Nos. 26 to 36 inclusive.	Straw Board Cuttings	POINTS CASE HARDENE
right and Annealed	AL DEFINAL DUVET BURNET BURN NO. 30 IS PIATORS' At /	Satinet Tailor Cities 2 6 2% Copper. 16 4 17 Yellow metal 13 4	Japanned
19 @ 26 dia 57% to 60 €	Serman Silver Scrap one-third can than not price of the		Galvanized
19 @ 26 dia 57) & 60 ft	50c. per B. additional. German Silver Scrap one-third eas than not price of 12 in. Market Metal. German Silver Turnings, Filings and Chipa, Balf the price of Scrap.	Yellow metal	
		Brass, heavy	
		Brass, heavy	
	High Brass. Low Brass. Copyr. No. 0 to 20		Rurden's Harcock
	High Brass. Low Brass. Copyr. No. 0 to 20	Brass 1git.	Burden's Horsest
Timed Nos. 0 to 18	High Brass. Low Brass. Copyr. No. 0 to 20		Burden's Horsest
Finned Nos. 0 to 18	High Brass. Low Brass. Copyr. No. 0 to 20		
Tinned Nos. 9 to 18. Cast Steet. Cast Stee	High Brass. Low Briss. Copt. No. 21		Burden's Horsest
Cast Steel. dle 20 a 25 s Tinned Broom Wire, Nos. 18 to 25. dls 24 a 25 s Gaivanized Telegrapa, Nos. 18 and 9 \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	High Brass. Low Briss. Copt. No. 21	Brass, heave 197 Brass,	CLINTON
Timed Nos. 0 to 18	High Brass. Low Briss. Copt. No. 21	Brass, heary 11 16 16 16 16 16 16 1	CLINTON
Timed Nos. 0 to 18	High Brass. Low Brass. Copyr. No. 0 to 20	Brass, heave 197 Brass,	

	1				
Blue, Prussian, fair to nest	Chair				准点
	Block Dryer, Patent, Am'n English	.ams't	cans, 1	0%c.; k	eg 9c
Brown, Spanish	Flocks		1	IC.;	4F 90
Van Dyke	Glue, White	******		99	500
Green, Chrome	" Sheet				1 M Let
** in oil	Glaziers' Points, Zinc Gum, Copal				960
Orange Mineral	Bhelisc, English. dark				430
	Litnarge.	******	******		9360
** English	Pamice Stone, selected Lump powdered				2400
Telephone of Assessment Control of the Control of t					
Hose Pink	Rotten Stone, soft, English.				a Br
" Burnt	Spirits Turpentine				
	Gine		0000000		780
" In Oll	FRENCH WINI				
44 In oil 14 GO 200	Prices current pe				
Vermillion, Chinese	Single Thick.—I	Лвсоц	nt 60 %.		
English	SIZES.	lst.	2d.	Sd,	4tm.
# Tricate	6 x 8 to 10 x 15 11 x 14 to 16 x 24	\$ 7:50 8:50	8 6:75 7:73	8 6:25 1:25	5-75
" ID 01] 10e	1 13 x 22 to 20 x 30	10:75	9-75	8:75	7-75
White, Paris, English, primein bbls. 3% @ 25cc	15 x 96 to 24 x 30	12:25	10.75	9:00	1
Yellow Ochre, French	26 x 36 to 26 x 44	14:50	13-25	10:75	
" Vermontin caska 1 %c	26 x 46 to 30 x 50	15:00	14'60	11.25	
Yellow Chrome	30 x 51 to 30 x 54 30 x 56 to 54 x 6	10:35	15.50	12:00	1
Zinc White, American No. 1 dry 9e	34 x 58 to 34 x 60	182.	17:25	15:00	1
1, in oil	96 x 60 to 40 x 60	20.75	18:75	17.72	1
" in oil 12e	Double Thick.—D	iscour 1st.	2d.	3d.	***
Linseed Raw # gal. casks. 76c. bbl., 77c	-	-	zu.	ou.	4th
Whale, Crude	6 x 8 to 10 x 15	\$15.00	\$11.00	\$10.00	\$ 9%5
Whale, Crude	11 x 14 to 16 x 24	13 75	12:50 15:75	11:75	10-20
Sperm, Crude	15 x 95 to 24 x 30	19-75	17.25	14:50	
" Winter unbleached " 1 66	26 x 28 to 24 x 36	21.00	18:50	15-75	
Seal Form Defined	26 x 36 to 26 x 41	23-25	21.25	17.25	1
Seal, Extra Refined	30 x 52 to 30 x 54	25.75	23: 25	18:00	1
* Spring * 90c	30 x 56 to 34 x 56	27.75	25.00	21.75	
Cotton Seed, Crude 62c	34 x 58 to 34 x 60	29-25	27.75	24.00	
Bouthern Yellow " 67c	36 x 60 to 40 x 60,			27-75	
Nestafoot, Winter	Sizes above 40 x 60-, 10:00 p	er box	extra 1	or ever	A use
Natura Lubricating	An additional 10 per cent. w	ill be	charge	l for all	Glass
Sundries.	more than 40 inches wide.	11 817	on abov	e 52 inc	hey in
Asphaltum	length, and not making more	than !	n unite	d inche	s, with

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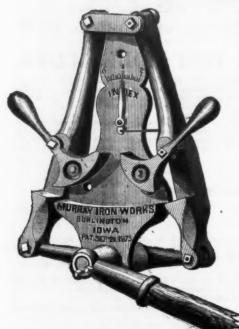
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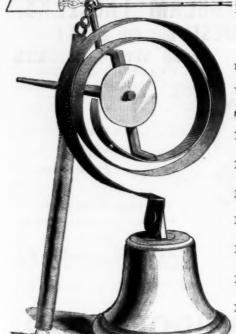
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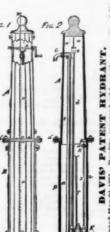
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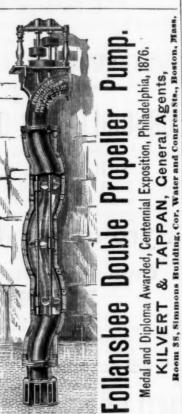
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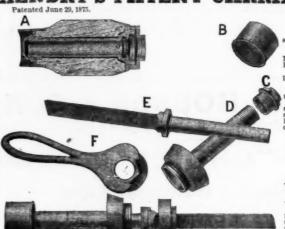
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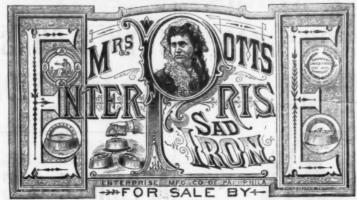
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40 %	Torry's Door	Flat Rail (1)4 Iron Wedges	Ends Veg	ned and	coun's	unk3%	c Tate	net net
45 % 50 %	Onyx. \$4'00 @ 4'25 Dixon. \$5'75 @ 6:00	Iron Crow I whether "Beetle Rings.	Bars (in or Wedge " or	dering Pinc	please h " poi	s state nt)4	C TO B	net net
10 % 10 % 45 %	Stanley Rule and Level Co. dis 20 @ 30&10 % Willis Thrall, No. 2 dis 30&10 % Disstoria No. 2 dis 30&10 %	% r'nd, beni	t to shape,	Sc P ft	of fen	ce, less off Star	15% of	f net List.
20 % 10 % 10 %	Diston's No. 2. dis 30&10 & Tracks, Sec.—Half Weight Tacks. dis 75 @ 75&10 & Trunk, Clout and Finishing Nails. net to 10 %	six months, Stove Bolts.	ending Ju	ts, \$500 ly and	Jan. 1.	75, 5&	ised 11 3 % of 60 % of	n f net f net
10 %	Traps. Genuine Oneida—Newhouse.	Machine and Coach and La Bolt Enda	Square Heig Screws	ad Bolts			10 % of 10 % of 10 % of	I net
25 % 70 % 75 %	Coes Pattern Wrought Bar dis 50 & 10 & 50 & 10 & 10 & 10 & 10 & 10 &	Pat. Hot Pres Washers, all I Nuts and Was	sed Sq. and made from shers in 25	Hex. N new be lb. box	nts and iron es, %c	714c n714c P b ex.	P B of	net net and
50 % 10 % 40 %	Agricultural Wrench	Washers in Nuts and W Standard Car	nots less the sahers in 5	ib. box	keg eas	P b ex.	isc # 1	net
10 % 40 €	Philadelphia Tooi Co.'s Pat. Duplex dis 25 \$ Wire.— dis 25 \$ Wire.—	200 lb. box 2%c % m ne	es, 1 in. dia t: % in. dia tarrow Tee	m. 2%c	B b net	et; %, !	y in. d	ed in liam.
net net b5 %	Wire.	Skein Bolts, i 414c # B no 614c # B no	n bulk, in let; 9-16 in.	diam. 5	keg or %c # 1	net:	in.d	liam.
75 % 20 % 20 %	Coppered t to 18	each size is Screw Hook in, diam., 7	ordered. and-Eye l c ≠ n net	Hinges,	with F	at. Hoo	ks, %	to 1
\$5 % 10 %	Novelty No. 10. \$63:00 Novelty No. 2: 66:00 Universal: 66:00	Screw and St Pat. Hooks	rap Hinger	-all si	zes und 3 4-10c ¥	ler 28 in.	long	have 0 and
10 % 50 %	BUFFALO.	Strap & T His Hereafter w	nges ve will not	make a	ny allo	wances	0 % of	ret eight
10 % 10 %	Reported by Mesors. Sidney Shepard & Co. March 1, 1877.	Pittaburgh. Screw Hitch 100 net: hes Bridge and R	ing Rings, avy. with 5-	light, v	with 14	ring, No	1, 84 100 ne	100 TP
10 % 10 % 10 %	Bells, Cow—\ 1 sw s Genuine	Bridge and R 1 to 2 in. di 1 to 2 in. dis	am. over 8 am. from 4	ft. long to 8 ft.	long		10 3 W	c net
25 % 25 % 25 %	Brass—Sheets	%, % and %	in. diam.	ver 4 f	t. long. t. long. to 4 ft	long	434	c net
10 % 10 %	Brick—Bath (box of 2 dox) Best English. \$1'13 Can Openers—Surague's dis 55&10 & dis 55&10	Bridge and R 1 to 2 in. dis 2 in. dis 3 k and % 8, k and % 87 and 8 wrought iros Wrought iros Grass Rods. Heel Boits. Duck Nest T Wrought Iros	plates, pu	nched.		%C.	C. W 1	b net c net
10 % 10 %	Framing Socket	Heel Boits Duck Nest To Wrought Iro	nyere Ironi n Repair L	inks.	*****	8 13°50	e W to	h net z net
rold 0%c	Castings Malleable	41	Rings Lap Ring	gs	DWARE.	36	50 % of	f net f net
in.	March 1, 1877,	Single Trees, best select most appro No. 1 South	Neck Yok ed Hickor ved patter	es and : y, and ns.	Double ironed	Trees, 1	made :	from the
10 %	Fluters—Geneva Hand D dow \$15:00	No. 2 Weste	TOTAL OF THE	roughte.		Descentable.	MCH4 OR	e nee
40 % 20 %	Hinges, Gate—Shepard'sdis 335,45 5 Hinges—Window Bling—dis 4045 5 Shepard a and Standard	No. 2 Weste complete, I No. 3 Wagon Irons all W	Single Tre	e, Iron	ed con	aplete,	ch, 50	c net
50 % 10 %	Hous, Coal-Plain, Black and Galvan'dnew list dis 15 5 Funnel, Black and dalvanized	No. 4 Wagon Irons all W	Single Tr rought : I	ee, Iron	ed con	nplete, Pieces	CH, 60	c net
25%	### Add From ### ### ### ### ### ### ### ### ### #	for wheel to Neck Yoke, I except End	o rub again Ironed com I Ferrules,	nst nplete, l with W	rons a	ii Wt., Rings.es	ch, 60 ch, 70	c net
son	Enameted dis 50 % Knives. Orawing—Oval No. 1 dis 60, 10&10 % Razor Blade dis 50, 10&10 % dis 60, 10 % dis 60,	rons all wrule No. 4 Wagon Irons all wriveted on for wheel t Neck Yoke, i except End Southern Plo plete, from Wagon Box 5 10 In. long b	w Double all wroug Strap Bolts	ht. For C	ironed orders	com- of 50 Set	ch, 60	e net
10 g 15 g 20 g	Without guard	10 in. long 1	F16	0.0	04	8 10 3 8	olta	45c 55c 65c 70c
10 %	Box Union and Eagle. dis 30 s Cut Nails, "Chesapeake," lbd. dis 30 s Horse, Auable. No. 5 7 8 9 10 c	12 ** 14 ** 10 ** 12 ** 14 **	9-16 N	60 66 80 8	46 46	8	65 65 64	80c 80c
8 10 % 9 00	" Pointed & Polished	14 " 16 " 18 " 20 "	200	64 66	60 60 64	8 8	65	1.00 1.00
8 90 \$	Freezers, Ice Cream—'Champion'. dis 23;45 5 Hinges—Window Bina—dis 4045 7 Hinges—Window Bina—dis 4045 7 Honges—Window Bina—Beneria and Standard. dis 604 15 Funnel, Black and Calvanid	5c W set for e made. In ordering	D CA	D-14-				
30 % 30 % 4 50	Screws—"American Screw Co — flat Head, Iron	Screw End. Wrought Iro Wrought Hat " Rul Double and S " Pole Caps, es Strap Bolts, Clips and For each ord following s Bolts, Riv Bevel Box tra discous unbject to wind on not and T Hing extra discous Single Tree is	n Bolster F	lates, 2	K in. w	vide, 🐃	et	45c
4 50 4 50	Tinned. \$1.25 Sifters—Ash. \$9.00 @ \$12.00 Skates and Strans—White's. \$9.00 @ \$12.00	Wrought Har	mmer Stra	ps, heav	y patte	ern, each	1	60c
10 % 10 %	Spoons, Iron Tinned	Double and a	ingle Tree	Clips,	figure i	each		9 C
10% i net	Printed Rogers' A No. 1. dls 40 S Britannis dls 55 G G S. Hall, Elton & Co. dls 55 G	Pole Caps, ea Strap Bolts,	Bolster P	lates, H	ammer	Straps,	Rub I	rons
25 % 25 % 25 %	Fairbanks dis 25 Stove Polish - Gem dis 15 Dixon's gross, \$4-50	For each ord following a Bolts, Riv	er amount goods: Wa ets, Skein	ing to gon Ha Bolts,	\$200 ne rdware Nuts,	et, or ov Carrias Washer	er, fore and	r the Tire
25 5	Palace # gross, \$3:00; bulk, per h. 9c Squeezer—Lemon, Porcelsian. # doz., \$5:40 Tacks—Half Weight Am. 1ron	tra discour	nt of 10 pe discount, of t deal in lin	r cent.	off all led in the	Wagen he order	Hardy Joh	ware,
8*00 25 % 8*50	Thermometers	and T Hing Iron to ma extra disco	ke order u unt of 10 p	of Bev p to \$2 er cent	el Box	and To	ngue	Cap e the
4	Vises—	Iron to ma extra disco Single Tree I Single Tree I Stay Chain I Wagon Box	Irona New	Dattor	D.	004	:h, 3% :h, 4% :ch, 3%	c net c net c net
&5 % 10	Wire-Bessemer Steel dis 15	Collar Wagon Box Collar.	Rods, wid	le track	with	Patent	ch, 714	c net
28 28 15	12x13.	Collar Wagon Brak Single Tree l	ron, Wt. E	inished look, N	with g	nardes le For-	ch, 7 ch, 20	c net
16 28 10 £	Pig Tin—Straits	Single Tree	Iron, Wt. 3	Hook Iron,	and 7-i Wrougi	6 Clipe	sch, 7	c net
435	Coppered Copper Copper Coppered Coppered Coppered Copper Coppered Copper Coppered Copper	Single Tree is single and Dieter Clip, Southern File End Clip when the Southern File End Clip which is southern File End Clip which is southern File End Clip when the Southern End Clip was and in the Southern End Clip was and I was an and I was an an and I was an an an and I was an	ow Center rith 5-16 in. End Ferr	Clip, 16 Hook- ule, Mi	în. We per set alieable	ided, an of 8 pie	d 7-16 ces. 3	enet
42 % 45 %	Sheets	Neck Yoke	Attachmer	it, with	plates	com-	en, 634 ach, 28	c net
10 @ 15% 15%	Tinned	Shank, 9-16	No. 2. For Fo	arm and	Lumb	er Wago	336 na, h, 636	c net
35 % 35 %	Copper—Sheathing 14 @ 18 oz	California T	ire Rivets	and Bur	rs, 5-16.	ob 39 10	10	ic net ic net ic net
10 %	Tinned Broom, Nos. 20 21 22 dis 35 5	Neck Yoke	" Bevel B Eyes, each. with	ox Iron	, to rive	ton,¥1	000 7:1	5 net c net
10 % 25 % 25 % 15 %		Wagon Rivet head, 14 in.	&, 1, 1%, an te, ex. large diam., 1 in	d 14 in nat, ov and lo	diam.	steeple	D 354	c net
20 %	13 Common.	Wagon lave	ta, 3-16 in. o to 1 inc a Nalla, ii	ham., 1 h long. n 5 b pa	per box	longer tes	Die le	c net extra extra
10 % 10 % 10 %	Gen. Russia, No. 1 stained	Wagon and I	Hinge Nain nger. 2%	d 24	ed by h 2 & 2% 15c # 1	and—	ad sho	orter.
50 % 25 %	Deep Stamped Plain and Retinned	3-16x3 and 12c W 1 Wagon Rive	longer. 25	c # B.	2 & 2 16c w ess lots	b. 1% a than	nd sho	b net
25 % 35 %		Double Tree Coupling	Plates	********			-	c net
40 % 50 %	CHICAGO. (The Chicago Stamping Co., 72, 74 & 76 Lake St.)	Wagon Rive one keg es Double Tree Coupling Tongue Neck Yoke I Tongue Cap No. 12 Ban Sand Band II Iron	Plates Iron, 1%, 2 d Iron.	& 234 fs	a. wide,	same p	rice	e net
10 % 15 u0	March 1, 1877. Tin Plate.— 14x30, IXX. Ch' Best. 12 75 10x14. (C.Ch'). Good 4 14x30, IXX 9 15 98	Iron, Hub Band 1						
10 %	March 1, 1877. Tin Plate;—	Wagon Chair net; ¼ in. Our prices	na, Stay, Lo , Sc net. are all sub	ock and	t Tong	ne, 5-16 e of me	in, p	D 7c
net .net	14x31 IX	out notice.						
10 % 10 %	20x28, IC, Beat 15 00 20x28, IX, 15 00 10x14, IC, Coke Plates 19 50	TUCI	ANUE	AC.	TUE	EER	S.	¥,
10 % 10 %	14x3v, IC, 55 10x30, IC, 725 Block Tin.— 11 25	N. K.	THE		Sen	ER	S	
25 % 12°00 300 30 % 16°87	Biscs Tis Large rigs	Sts., N. V.	CHO	100	TILL M	PG. Co.		In
16°57 800 10 % 35°50	Sheathing	- 2 M	SE		HOIAN	201		diam
300 1 \$9:50	Plantshed Sec Boller lengths 40c	AHAM 4.95 Re				40.000	+	Indianapolis,
\$9.00 \$8.50	30x60, 6 to 7 lbs 9 5 NSc 20x60, 10 to 12 lbs 9 5 Nsc 30x60, 6 to 9 lbs 25c 30x60, 15 to 100 lbs. 25c Selder. F. S. & Co.'s make	GRAE unbers &	1	/ li	FF.			
7:00	Rest Fine	Chamb	N			1	ľ	Ind.
50 g -, 56c -, 50c	Boller lengths 40c Bot Sheets 50c0, 10 to 12 Rs 10 to 50c0, 15 to 100 lbs 10 to 50c0, 15 to	Il3 Char	• 9	-				
	\$9. 2		-					

7	HE IRON AGE	
.	Sheet Iron	
	No. 24 Sixe Mo. 27. Sixe Mo. 27. Sixe Mo. 27.	
	Galvanized Iron.	
	American Russin.— B	
2	Lead.— Lead Pipe, in full coils 9 Pig	
	Coppereddis 40 \$	
	PITTSBURGH. The following are the Card rates, f. o. b. in Pittsburgh of Lewis, Oliver & Phillips, H. B. Newhall, 11 Warren St.	
200	The following are the Card rates, f. o. b. in Pittsburgh of Lewis, Oliver & Phillips, H. B. Newhall, Il Warren St. New York, Agent. Merchant Bar Iron	
5	Fine that (1) Asy, plutched and countries. See # net fron Wedges. See # net Norway Nall Rook, Vasa. 7 c # net Iron Crow Bars (in ordering please state whether "Wedge" or "Pinch" point). 4 c # net Reetle Rings. 5%c # net Fence Pickets.	
	Fence Pickets— % r'nd, bent to shape, %c \$ ft. of fence, less 15 % off net Discount off Standard List.	93
	% I'nd, bent to shape, 25 c # ft. of fence, less 15 % off net Discount off Standard List. six months, ending July and Jan. 1 75, 68 3 % off net Etove Bolts	1
	Coach and Lag Screws	1
-	Washers, all made from new band iron 7% F B off net Nuts and Washers in 25 lb. boxes, % F B ex. Nuts and Washers in lots less than one keg each size, % F B ex. Nuts and Washers in 5 lb. boxes, lc. W B ex.	
	Nuts and Washers in 5 lb. boxes, lc, \$\psi\$ be ex. Standard Caps, for Plows	
	Pat. Headed Harrow Teeth, packed in boxes, %c P B ex. Skein Bolts, in bulk, in lots of 1 keg or more, % in. diam. 4 c P B net: 9-16 in. diam. 5 %c P B net: % in. diam.	
	each size is ordered. Screw Hook and Eye Hinges, with Pat. Hooks, % to 1 in. diam., 7c * n net; % in. diam., 8c * n net; %	
9	0%c ♥ B net. %c ♥ B oarra when less than 1 keg of each size is ordered. Screw Hook and Sye Hinges, with Pat. Hooks, % to 1 in. diam., fc ♥ B net; % in. diam., sc ♥ B net; 6, 8, 10 and 12 in. long, 4 9-10c ♥ B net.	
	Hereafter we will not make any allowances for freight on Strap and T Hinges: our price on them is F. O. R. in	
	Screw Hitching Rings, light, with ¼ ring, No. 1, \$4:00 \$\pi\$ 100 net: heavy, with 5-16 ring, No. 2, \$4:50 \$\pi\$ 100 net. Bridge and Roof Bolts—	
	Pittsburgh. Screw Hitching Rings, light, with ¼ ring, No. 1, \$4:00 \$\text{ No. 10}\$ net: heavy, with 5:16 ring, No. 2, \$4:50 \$\text{ No. 10}\$ net: heavy, with 5:16 ring, No. 2, \$4:50 \$\text{ No. 10}\$ note: Pitts and Roof Boltzs. 1 to 2 in. diam. over \$ f. long	
3 6	75, % and % in diata. From 1% to 4 rt. 1009 " 4% c net Bridge bolts with upset ends	
	Yrought from paness paneties 34.6. W S net Cast from Washers W S 35.6 net Grass Rods 74.6 W S net Heel Bolts 85.8 C net Rod Rods 813.50 W doz net Wrought from Repair Links 813.50 W doz net Wrought Rings 50.5 off net Lap Rings 50.5 off net Lap Rings 50.5 off net Rods 50.5 off net R	
Bull		
0 4 6 6	Single Trees, Neck Yokes and Double Trees, made from best selected Hickory, and ironed complete, in the most approved patterns. No. 1 Southern Piew Single Tree, Ironed complete, Irons all Wroughteach, Sic net No. 2 Western Piow Single Tree, Ironed complete, Irons all Wrought.	
0	complete, Irons all Wroughteach, Sc net No. 2 Western Plow Single Tree, Ironed complete, Irons all Wroughteach, Sc net No. 3 Wagon Single Tree, Ironed complete, Irons all Wrought, except Malleable Fer-	
5 66	No. 4 Wagon Single Tree, Ironed complete.	
6 0	Irons all Wrought; Improved Rnd Pieces riveted on; one side acts as a wear iron for wheel to rub against. Next Yoke, Ironed complete, Irons all Wt., except End Ferrules, with Wt. Iron Rings.each, 70c net Southern Plow Double Tree, Ironed com- plete, Irons all wrought. Wagon Box Strap Boits—For Orders of 50 Set, 45 5 dis. 10 In. long by 7-16 at Screw End, W set of 8 boits. 45c 12 45.	
	Southern Plow Double Tree, ironed complete, frons all wroughteach, 60c net Wagon Box Strap Bolts—For Orders of 50 Set, 45 % dis.	
	10 - 9-16 - 8 - 65c	
5	14	
6000	16 " 8 " . 1 '00 18 " . 1 '00 18 " . 1 '10 18	
	made. In ordering Box Strap Boits please give diameter at Screw End. Wrought Iron Bolster Plates, 2% in. wide, * set	
5 0 0	Wrought Hammer Straps, heavy pattern, each 13 c	
5	Wronght Hammer Straps, heavy pattern, each.	
	Pole Caps, each	
# U O	For each order amounting to \$300 net, or over, for the following goods: Wagon Hardware, Carriage and Tire Bolts, Rivets, Skein Bolts, Nuts, Washers, Chains,	
00	Pole Caps, each	
*	and I thinges in few of sever Box and Tongue Cap Iron to make order up to \$300 worth and secure the stra discount of 10 per cent. Single Tree Heoks, Nos. 1 and 2	
4	Single Tree Irons, New Pattern each, 4%c net Stay Chain Hooks each, 5%e net Wagon Box Rods, narrow track, with Pat. Collar each, 7%c net Wagon Box Rods, wide track, with Patent Collar	ľ
0000	Wagon Box Rods, wide track, with Patent Collar	
000	Single Tree Iron, Wt. Hook, Malleable Fer- ruleeach, 7% net Single Tree Iron, Wt. 3% Hook and 7-16 Clip. each, 7c net Single and Double Tree Iron, Wrought Gen-	l
cie	Tile. Stude Tree Iron, Wt. 3/ Hook and 7-18 Cily, each, 'ic net single and Double Tree Iron, Wrought Center Unique and Double Tree Iron, Wrought Center Cilp, 3/ in. Welded, and 7-18 Cily with 5-18 in. Hook—per set of 8 pieces, 30c net Neck Yoke End Cilp with 5-16 in. Hook—per set of 8 pieces, 30c net Neck Yoke End Ferrule, Malicable, with Wt. Iron Ring.	
8 UU C %	Nook Voke Attachment with plates com-	
% × %	"For Farm and Lumber Wagons, Shank, 9-16 in flat part 1% in	۱
cec	Wagon Box Staples, 1¼ to 2¼ in. to clinch. ₩ 1000 \$10 75 net	
cee	n "Bevel Box Iron, to rivet on, \$\psi\ 0000 725\ net Neck Yoke Eyes, each	1
10	Wagon Rivets, ex. large flat, oval and steeple head, in. diam., i in. and longer	1
c	" & Nalls, in 5 m paper boxes " Ic extra " in 55 m vood " " \\ Wagon and Hinge Nalls, pointed by hand— \[\text{kg3} and longer, 2\text{k} \text{k} \text{2} \text{k} \text{2} \text{k} \text{2} \text{k} \text{4} \text{m} \text{d and shorter.} \]	
M M M	Original de la company de la c	
1	Wagon Riveta and Mails, in less lots than one keg each size. Double Trae Plates. Coupling the Plates. Nex Yoke Plates. Six net Tongue Cap Iron, 13, 2 & 2% in. wide, same price \$\Psi\$ as	
	Tongue "Ye net Neck Yoke Plates. "Sye net Tongue Cap Iron, 1%, 2 & 2% in. wide, same price W has No. 12 Band Iron.	
100	Sand Band Iron, 1¼ in. wide, same price as No. 12 Band Iron, Hub Band Iron, 54c * 5 over price of same size Band Iron	
20000	Wagon Chains, Stay, Lock and Tongue, 5-16 in, \$ \$ 7c net; \$\frac{1}{2}\$ fa., &c net. Our prices are all subject to change of market, without notice.	

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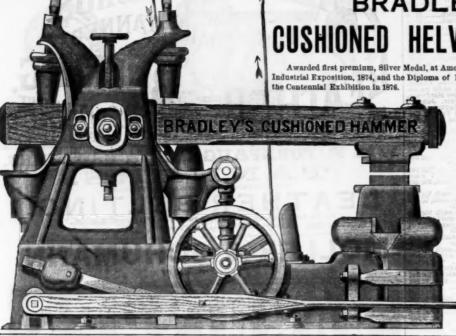


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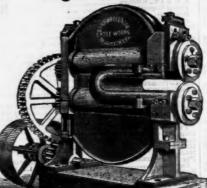


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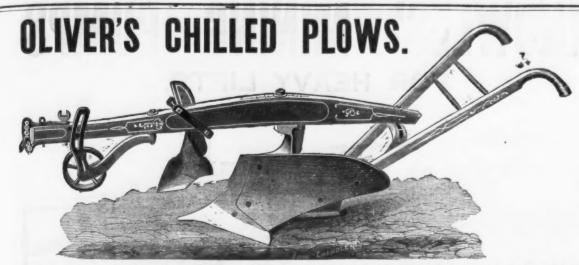
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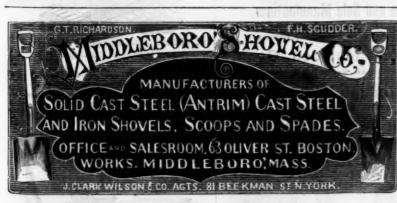
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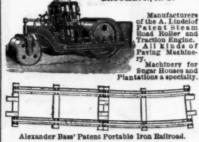
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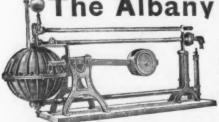
For dimensions of Governor, see Illustrated Price List.



	Siz	Pla	Bri Fi	Ex Bpe	Sto
	*	\$16 00 18:00	\$18.00	\$1.90	**
W 8 W	176	30.00	35.00	8.00	\$5.00
5	134	83.00	96.00	8.25	6.00
	134	26:00	30.00	2.20	8.00
	2	81.00	35.00	2.75	10.00
	234	86.00	41.00	8 25	12.00
	236	40.00	45.00	8.50	14.00
	236	45 00	51.00	8.75	16.00
	3	50.00	57:00	4.95	19 00
	836	89.00	67:00	4.80	\$3.00
	4	69.00	78:00	5.00	28.00
	436	80.00	90.00	5.20	84'00
4. A.	5	90.00	101.00	6.00	40.00
	536	105.00	117.00		46.00
	6	120.00	138:00	7 00	54.00
THE TUDOON DATES	7	142.00	156:00	8.00	65.00
THE JUDSON PATENT	8	175 00	185.00	9.00	79.00
Improved Steam Governor.	9	198.00	218.00	10.00	0.0
improved oteam dovernor.	10	210.00	240.00	13.00	**

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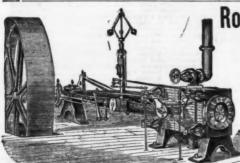
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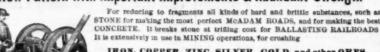


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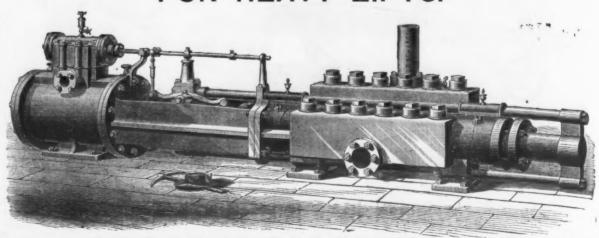
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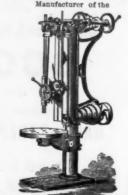
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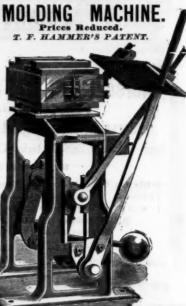
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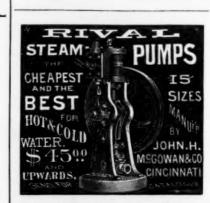
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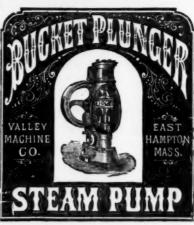
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Third.—Because they are made of refined and new metals, and not produced from drosses resmelted. Fourth. - Because, being porous in their nature, they hold the oil necessary for proper lubrication Fifth.—Because they are hard enough to insure a polished surface to the moving parts, and not deoy or heat the journal.

Sixth.—Because they are free flowing, and if properly melted contain no dross. Seventh.—Because by reducing the friction they increase the useful effects.

Eighth.—Because they are cheap and economical, reducing the expenditure of oil, coal, time, labor and ar of machinery.

Ninth .. - Because the best mechanics use them. Tenth.—Because, from long and extended experience as engineers and metallurgists, we try to produce the best metals that will give the best practical results, and we believe we have succeeded.

Eleventh.-Because we warrant our metals.

Twelfth.—Because we are open for competition from any respectable manufacturer of Anti-Friction Metals who can produce a better metal, a more reliable metal, and a cheaper metal than we make, and in-

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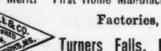
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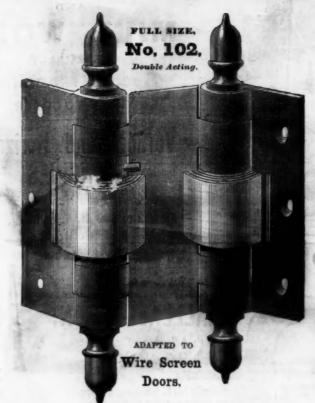
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